# FOOD Manufacture

CORROSION PREVENTION

A PUBLICATION OF THE LEONARD HILL TECHNICAL GROUP

Vol. XXXV No. 11 NOVEMBER 1960

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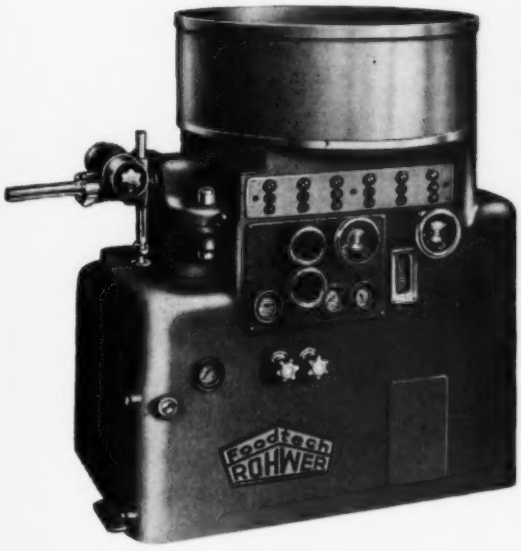


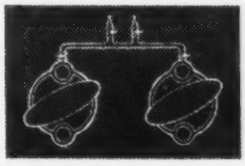

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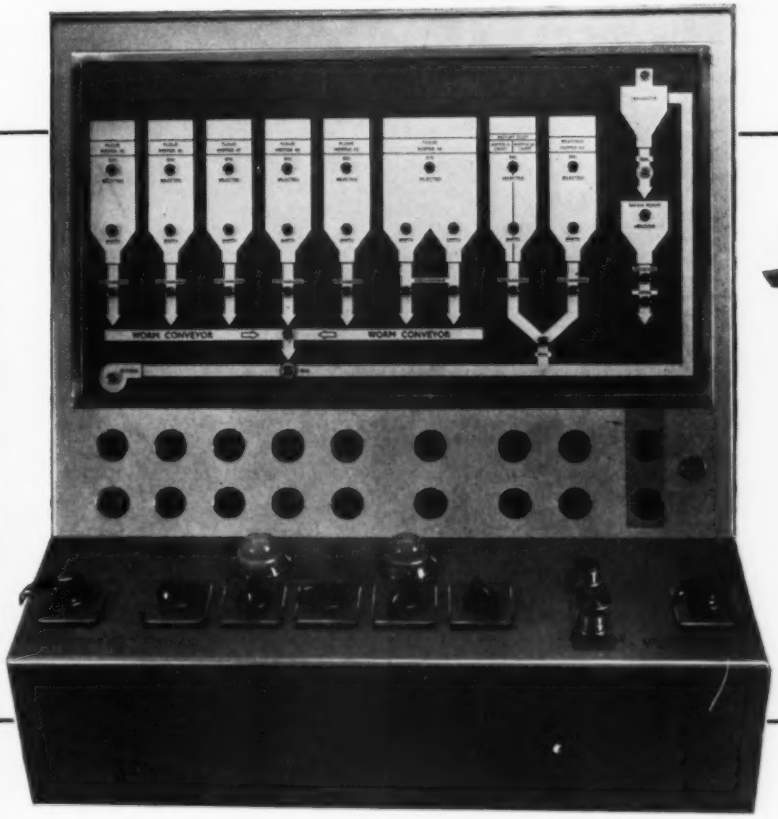

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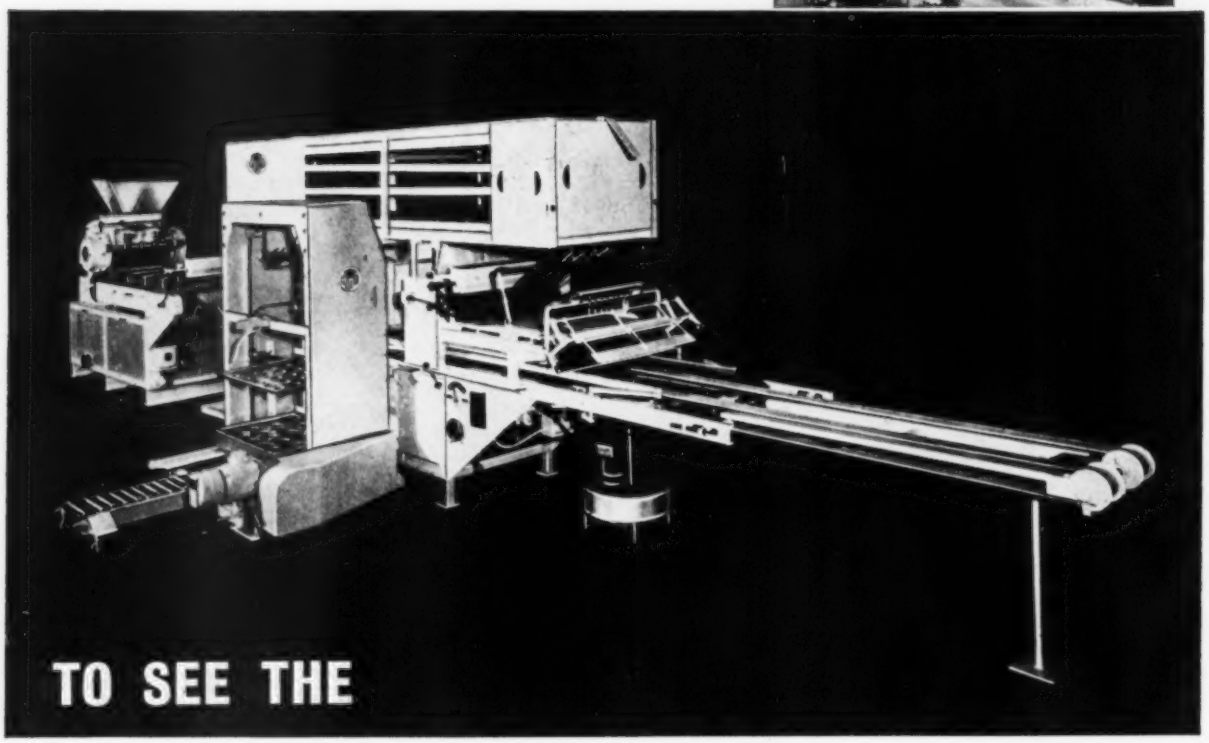

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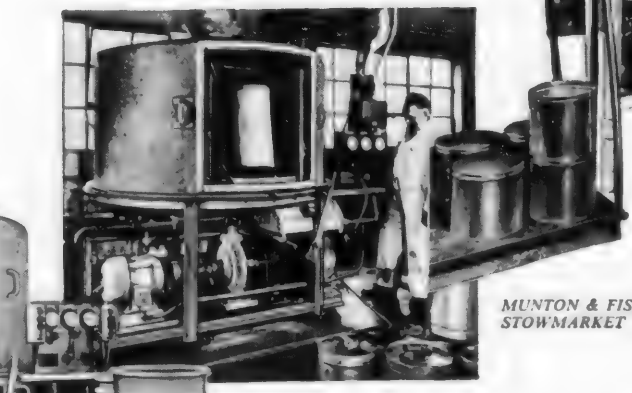

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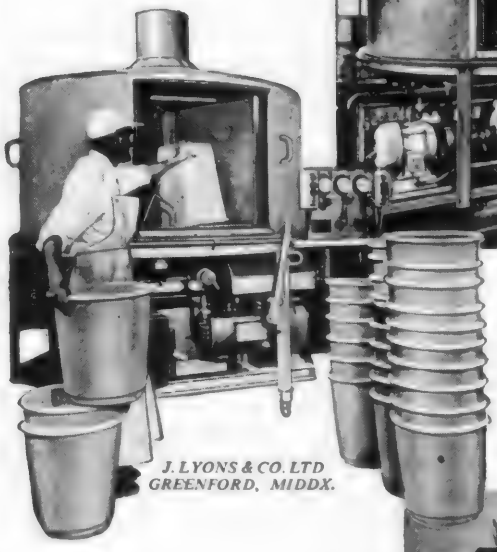

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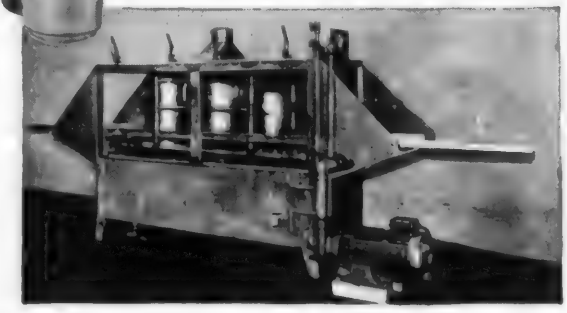

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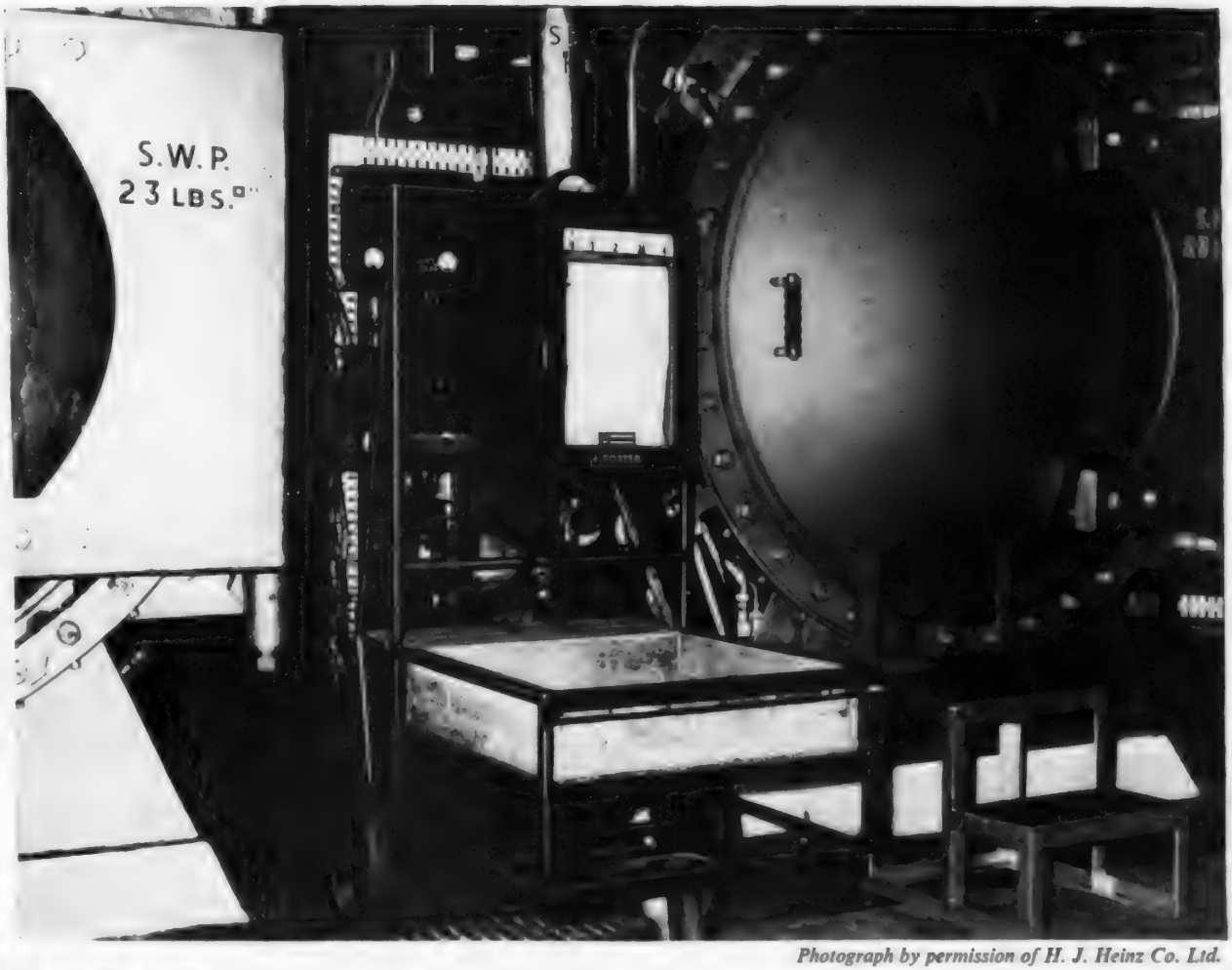


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Adv./WT/27/F

*Mobile butcher's shop built by Longwell Green Coachworks Ltd., Bristol, for Applebys (Otton of Glastonbury) Ltd., High Street, Glastonbury, showing interior panelling of ceiling and walls, and facing of counters with 'Darvic' p.v.c. sheet.*

# 'DARVIC' GETS AROUND

## *Mobile butcher's shop makes great use of modern, hygienic material*

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A wide range of pleasing, modern colours is available. Wherever 'Darvic' is used, the overall effect is attractive, gay, spotless and essentially up-to-date.

**'DARVIC'**

*'Darvic' is the registered trade mark for the rigid p.v.c. sheet made by I.C.I.*

IMPERIAL CHEMICAL INDUSTRIES LIMITED · LONDON · SW1

# In 3 Seconds from NOW...

your Pack will have sold

— or failed!

At this moment of indecision the initial impact of a well packaged product may swing the sale in its favour. A distinctive pack — designed to appeal — will lift it right off the counter, so make absolutely certain that your product is in the best pack, by consulting Dring.

FOR PACKS THAT *ask* TO BE SOLD—

*-ring* **Dring**

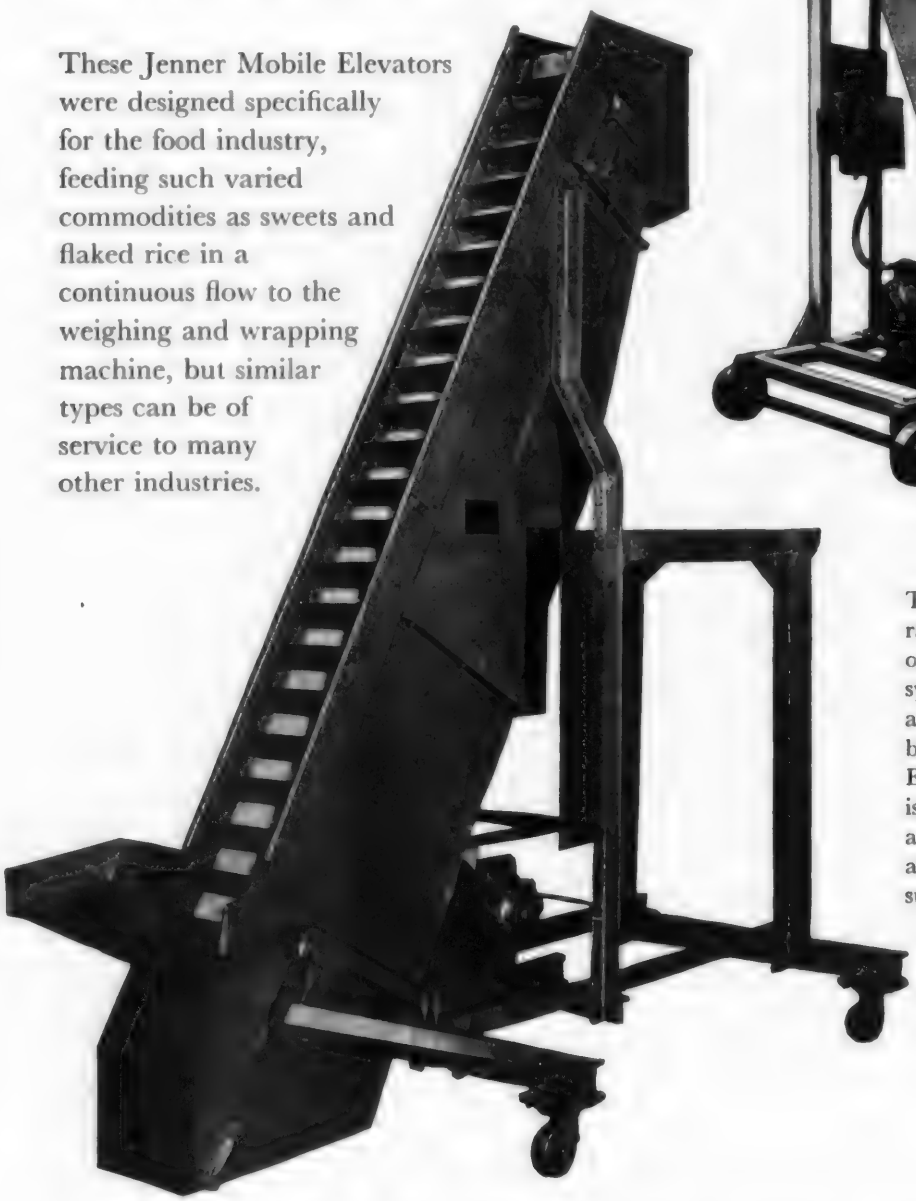
**J. DRING LTD · THE AIRPORT · PORTSMOUTH · Tel: 61291-2-3-4**

London Office: 96/100 Aldersgate Street, E.C.1. Telephone: MONarch 6268

# Jenners

## mobile elevators

These Jenner Mobile Elevators were designed specifically for the food industry, feeding such varied commodities as sweets and flaked rice in a continuous flow to the weighing and wrapping machine, but similar types can be of service to many other industries.



They may be mounted on a rail track to work with a bank of machines in operations synchronised by Jenner automatic control, or they may be entirely mobile.
Every Jenner Mobile Elevator is designed for easy cleaning, and pick-ups can be of steel, aluminium, wood or plastic to suit different processes.

**A. & C. JENNER LTD · CLARENDON WORKS · MITCHAM · SURREY · Telephone: MITCHAM 9281/4**

## *an extensive range–*

of **HIGH-SPEED CENTRIFUGALS** for rapid, hygienic food processing made of suitable corrosion resisting materials

*Broadbent high duty sugar centrifugals in a modern sugar factory.*

Over 90 years experience in the specialised field of centrifuging enables us to recommend the most satisfactory equipment for increasing your production.

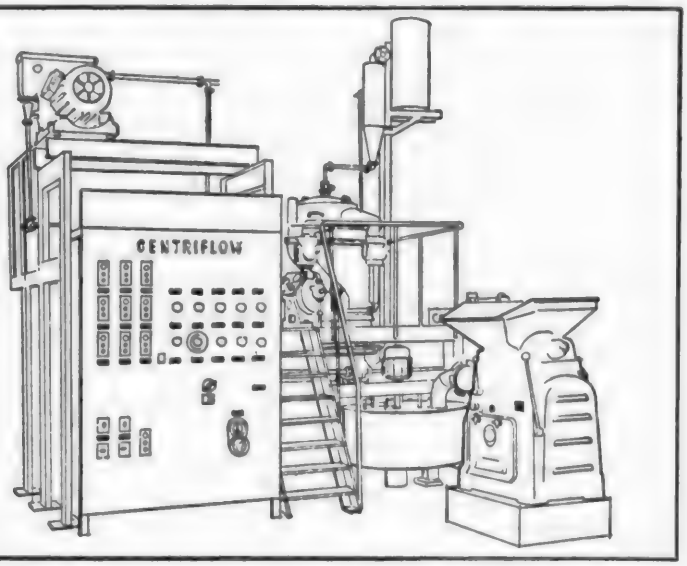
**THOMAS BROADBENT & SONS LTD., HUDDERSFIELD.**

*Phone: 5320/5 Grams: BROADBENT, Huddersfield*

ALFA-LAVAL
DE LAVAL

# CENTRIFLOW
## FOR ANIMAL FATS

**HIGHER YIELD OF BETTER FAT AT LOWER COST**



Mincer
Capacities from
¼ to 4 tons hr.

## IMPARTIAL EXPERTS PREFER CENTRIFLOW PROCESSED FATS

A famous packers' research institute recently tested the product of Centriflow plant run by one of their members and rates it as follows (on a scale of 1 to 10):

| | | | |
|---|---|---|---|
| **Colour** | 9 | **Taste** | 9 |
| **Smell** | 9 | **Consistency** | 10 |
| **TOTAL SCORE (out of a possible 40)** | | | 37 |

This is the highest rating ever given by the institute referred to and compares well with their minimum export rating of 22. It is now recommending the Centriflow process to all its members.

### HE PUTS THROUGH 3,300 LBS/HOUR – ALONE

A continuous process with mechanical disintegration and De Laval Centrifugal Separation. Yields up to 99.5% of fat makes you competitive in any market.

*Write for Catalogue 24270*

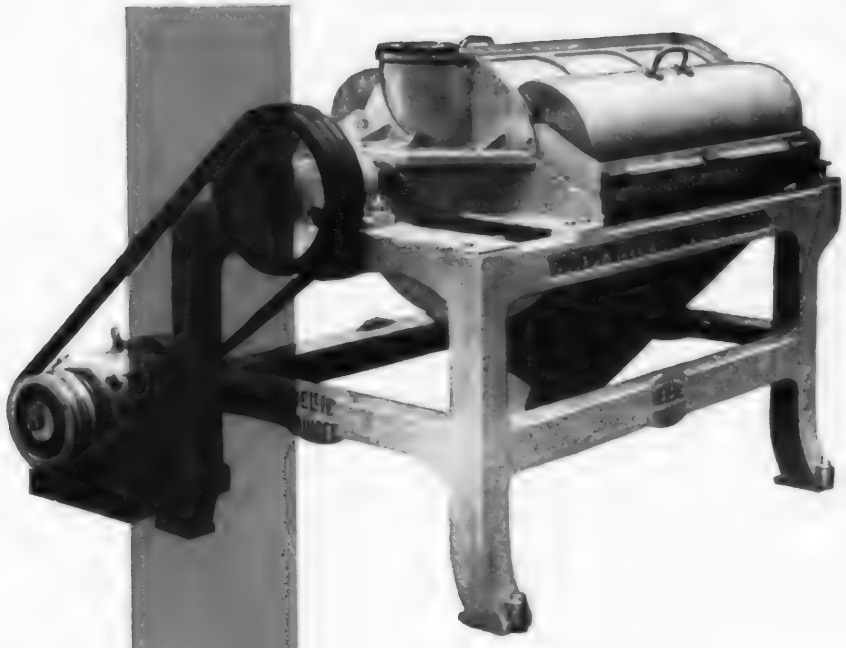
De Laval complete plants giving the most up-to-date techniques are available for:

**Continuous Soap Production**
**Continuous Vegetable Oil Refining**
**Continuous Soap Splitting**
**Continuous Degumming of Linseed Oil**
**Continuous Solvent Wool Scouring**
**Continuous Fish Oil and Fish Liver**
**Continuous Oil Production**

**INTEGRATED PLANTS**

**ALFA-LAVAL COMPANY LTD**
**Great West Road, Brentford, Middlesex**
**Tel: ISLeworth 1221**

Smee's DL430



*the super* **PULPER** *with the big capacity...*

KELLIE

# HEAVY DUTY PULPING MACHINE

**A sturdy reliable machine with a tremendous capacity, the Kellie Heavy Duty Pulping machine can easily handle up to 20 tons of material per hour. Food products such as tomatoes, apples, prunes, plums, figs, oranges, berries etc. deftly cycloned, sieved and reduced to a liquid or semi-liquid state.**

**The roughage—skins, seeds, cores and other residue is efficiently strained off. In certain cases where it is necessary to pass the seeds and some chunks into the finished products, this is effectively controlled by fitting a suitable perforated pulping screen.**

**The Kellie Heavy Duty Pulping machine is capable of dealing with 10 to 20 tons per hour according to the nature of the product. The machine is equally efficient as a rougher or finisher with the use of interchangeable screens.**

**Send today for full particulars.**

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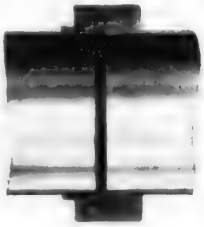
Telephone: DUNDEE 25687/8

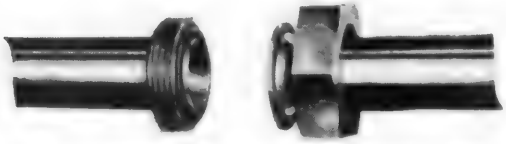
Telegrams & Cables: "KELLIE" DUNDEE

# APV HYGIENIC STAINLESS

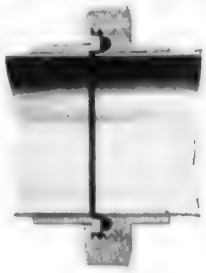
Type " S.P." Pipe Fittings.—designed for in-place cleaning.



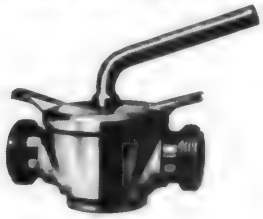
# STEEL PIPE FITTINGS,



Type " R.J.T." Pipe Fittings—the British Standard Ring Joint Type.

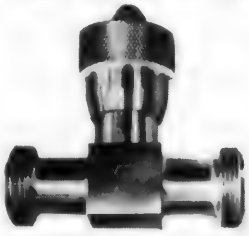


# COCKS, VALVES & PUMPS



The " W.A." Cock. Wide angle, full bore, crevice-free, non-galling and self-draining.

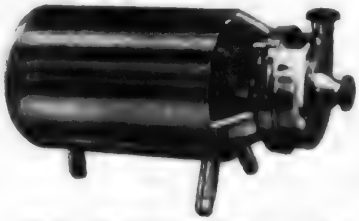
The " Paravalve." A light-weight leak-proof valve with 180° control. Suitable for high pressure work.



Graduated Control Valve. Precise control of flow with calibrated settings.

# FOR THE SAFE MOVEMENT

" Zephyr " Air Operated Valve. For remote and automatic control. Designed for in-place cleaning.



" Puma " Stainless Steel Pumps. Easily cleaned sanitary pumps with interchangeable standard motors and seals.

**APV**

*Descriptive publications will be sent on request.*

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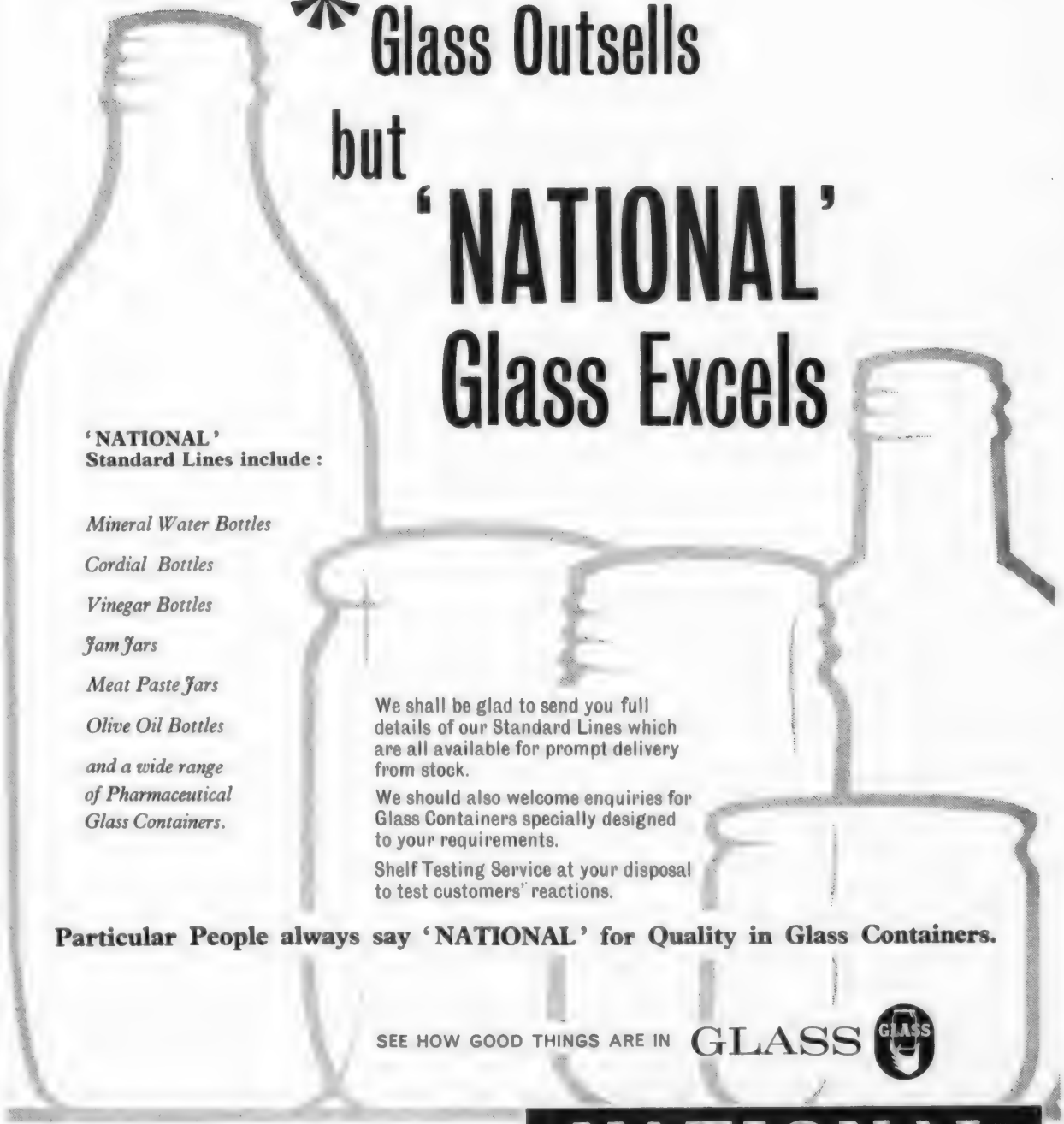
# * Glass Outsells but 'NATIONAL' Glass Excels



**'NATIONAL' Standard Lines include :**

*Mineral Water Bottles*

*Cordial Bottles*

*Vinegar Bottles*

*Jam Jars*

*Meat Paste Jars*

*Olive Oil Bottles*

*and a wide range of Pharmaceutical Glass Containers.*

We shall be glad to send you full details of our Standard Lines which are all available for prompt delivery from stock.

We should also welcome enquiries for Glass Containers specially designed to your requirements.

Shelf Testing Service at your disposal to test customers' reactions.

**Particular People always say 'NATIONAL' for Quality in Glass Containers.**

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* *Independent Research at self-service stores has shown that when identical products are offered in Glass Containers and in an alternative pack side by side, Glass outsells the other.*
*May we send you full details of this most enlightening Research?*

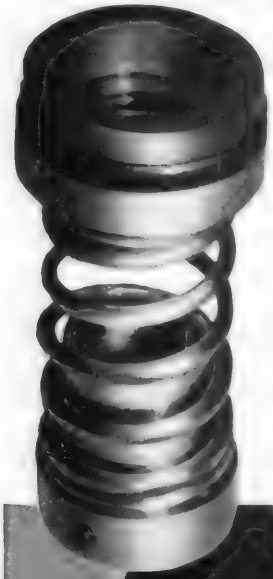
Regd Trade Mark

# 17 ROUSERS

## and no leakage with

## flexibox

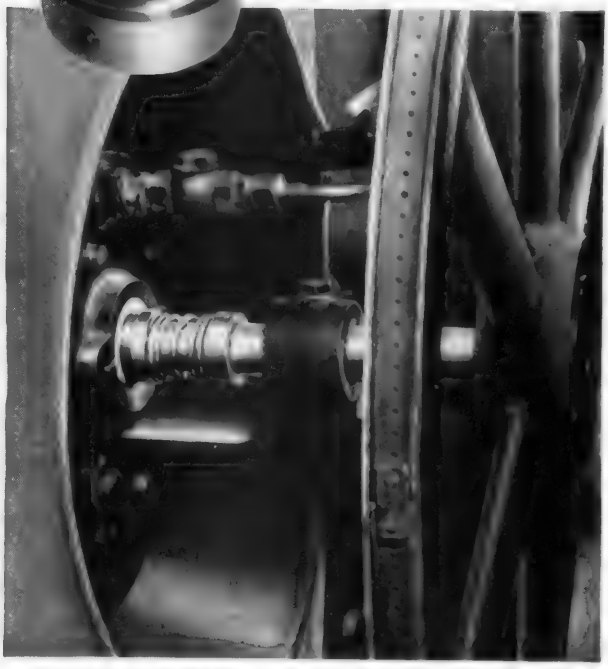
## mechanical seals



Flexibox F type mechanical seals were chosen to seal the glands of Pontifex rouser gear on each of seventeen beer conditioning tanks at The Ely Brewery Co. Ltd. Cardiff.

*Flexibox F type seals were selected because—*

- they are externally mounted so that the spring is not in contact with the fluid being handled.
- an absence of keys, slots or pins means easy cleaning and hygienic operation.
- the seal rings cannot blow out if excessive pressures develop.
- they provide leak-free service over long periods with minimum maintenance.



*If YOUR problem involves gland sealing rotary food-handling equipment, write for a copy of the new Flexibox catalogue to:-*

**FLEXIBOX LIMITED**

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Telephone: Trafford Park 1477 Telegrams: Flexibox Manchester Telex

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## For clean, gleaming interiors

Here is a coating for your walls, wood and metal-work which is easy to apply and sets with a tile-like surface that withstands damp, steam, condensation, oils, washing and hard wear.

In food factories, warehouses, offices, canteens and wherever cleanliness is important Permoglaze is nowadays replacing ordinary paints and enamels because its hard glazed surface repels dirt and is so easy to keep clean.

Mould-infected surfaces can be cured by the application of Permoglaze Anti-mould grade which possesses unique germicidal properties.

Permoglaze is supplied ready for application in white and colours in Gloss, Eggshell and Satin finishes.

Write now for colour card and booklet describing how to Permoglaze walls and other surfaces.

**Permoglaze**

THE TILE-LIKE FINISH

MADE BY

PERMOGLAZE LTD · TYSELEY · BIRMINGHAM 11

*Depots at*

*Cardiff, Leeds, Glasgow, Manchester, Nottingham & Norwich*

**Flexible, simple and smooth in operation . . .**

# *The new* FE-LINE

## OVERHEAD WIRE ROPE CONVEYORS

*(segmented NOT continuous rope)*

The smooth and efficient running of the FE-LINE Overhead Conveyor gives you a system of greater flexibility combined with simplicity.

The FE-LINE has a minimum of wearing parts and "Sealed for life" bearings. Can be used where the most stringent cleanliness has to be observed i.e. Food factories and Bottling plants, Dairies and Bakeries. For operation, lubrication is confined to a minimum. Power requirements are low and operation is smooth, clean and quiet. Let us solve your handling problems, please write or telephone.

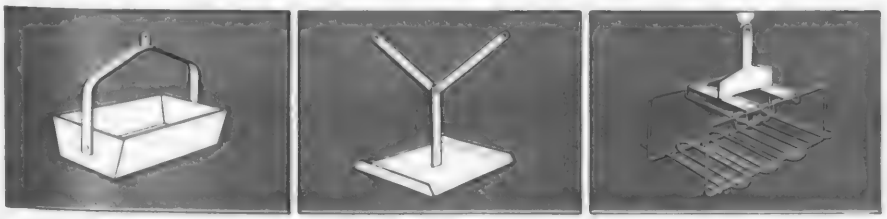
- Easily installed.
- Little maintenance required.
- Capacity 10–600 lbs.

FE-LINE
STRONG AND SINUOUS

## FE-LINE
### OVERHEAD WIRE ROPE CONVEYORS

**CONVEYOR AND SHOTBLAST LIMITED**

**LEIGHTON BUZZARD, BEDFORDSHIRE**



*Telephone:*
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**FE-LINE CARRIERS . . .**
*Let us design and manufacture your carriers for use in FE-LINE conveyors.*

**LARGE**

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**small**

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quality and care is the accepted privilege of all our customers.
Our knowledge is wide and rooted deep in long experience.
Our service is yours for the asking.

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**Essences**

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# Do all your packaged products stand up to the 'eye-appeal' test?

At the point of purchase, on the retailers' shelves,
do your products say 'buy me'?
Standing side by side or one on top of the other, do they look
at least as good as you know them to be?
At Jackson Glass, we do more than produce bottles and jars
to customers' requirements—we design containers
with the actual product in mind.
And not just the container either, but its closure, its label,
and its display box if you wish.
This is the Jackson Glass service—producing containers
*with the sales of the product in mind.*
What do we mean by 'eye appeal'?
Simply a pack which makes the most of the product it contains—
enhancing colours—flattering shapes and most important,
looking value for money.
Get on to Jackson Glass and see if some of our packs
can say 'buy me' to you.

**Jackson**
**packaging advisory service**
A comprehensive service embracing design
and advice on glass containers,
closures, labelling, display boxes and outers.
This service also offers to manufacturers,
packing in containers other than glass,
free market research facilities on 'design
preference testing', 'container-in-use
testing' and 'shelf testing', as well
as an area test marketing service
at a nominal charge.
Ring Museum 7263 with any problem you
may have or write for informative booklet.

**Jackson research unit**
A team of experts, perfecting new types
of glass packs and closures.
If you have a new product or want to give
a new look to an existing one,
we may already have the answer for you.

*If your company is concerned with packing and you have not yet received the latest copy of the Jackson Glass Journal 'Look Ahead' please write so that we can put you on our mailing list.*

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## takes the guesswork out of commerci

Canners throughout the world have adopted IMC Continuous Pressure Cooker and Cooler units for all products that require cooking at high temperatures, assuring them of uniformly sterile, highest quality packs.

IMC equipment, built to your own product requirements and can specifications, are precision built throughout in our European plant, with centralized automatic control board permitting one man to operate one or many complete sterilizing units. Protective stops and safety devices are provided for convenience of operation.

Thanks to these advantages you can produce a uniformly processed high quality pack at high speeds and with minimum labour costs; thus improving the sales value of your products while rapidly amortizing investment.

### *EXPERIENCE HAS PROVEN THESE IMC COOKER-COOLER ADVANTAGES:*

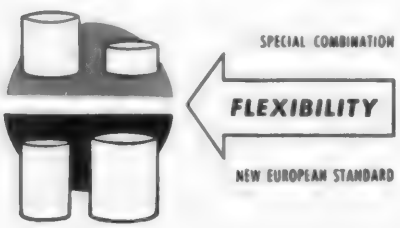
**LABOUR SAVINGS:** The IMC Continuous Pressure Cooker and Cooler is often called the "One-Man Mass Production Kitchen". Only one man is required to maintain a battery of installations.

**HIGHEST QUALITY PACKS:** Agitating principle permits rapid heat penetration, and in most cases reduces cooking time. Every can is evenly cooked; every can is cooked exactly alike. High temperature short time cook often results in superior colour, flavour and texture.

**DAMAGE AND HANDLING COSTS REDUCED:** This continuous mechanical can handling process substantially reduces loss from can denting and damage.

**STEAM SAVINGS:** Substantial steam savings are possible through reduced processing and heat losses.

If your next canning season includes soups, vegetables, fruits and acid foods, milk, meat, ravioli, spaghetti or other mixed foods, be sure to request our literature, a quotation, or the visit of one of our engineers to assist you in budgeting for higher quality at lower cost.




*The most widely used food processing equipment in the world is IMC-FMC equipment, now built and readily available in Europe.*

ATIC

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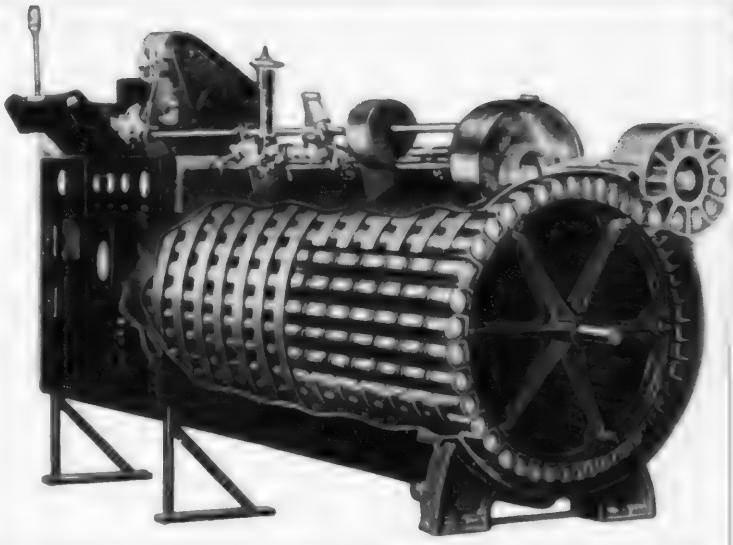

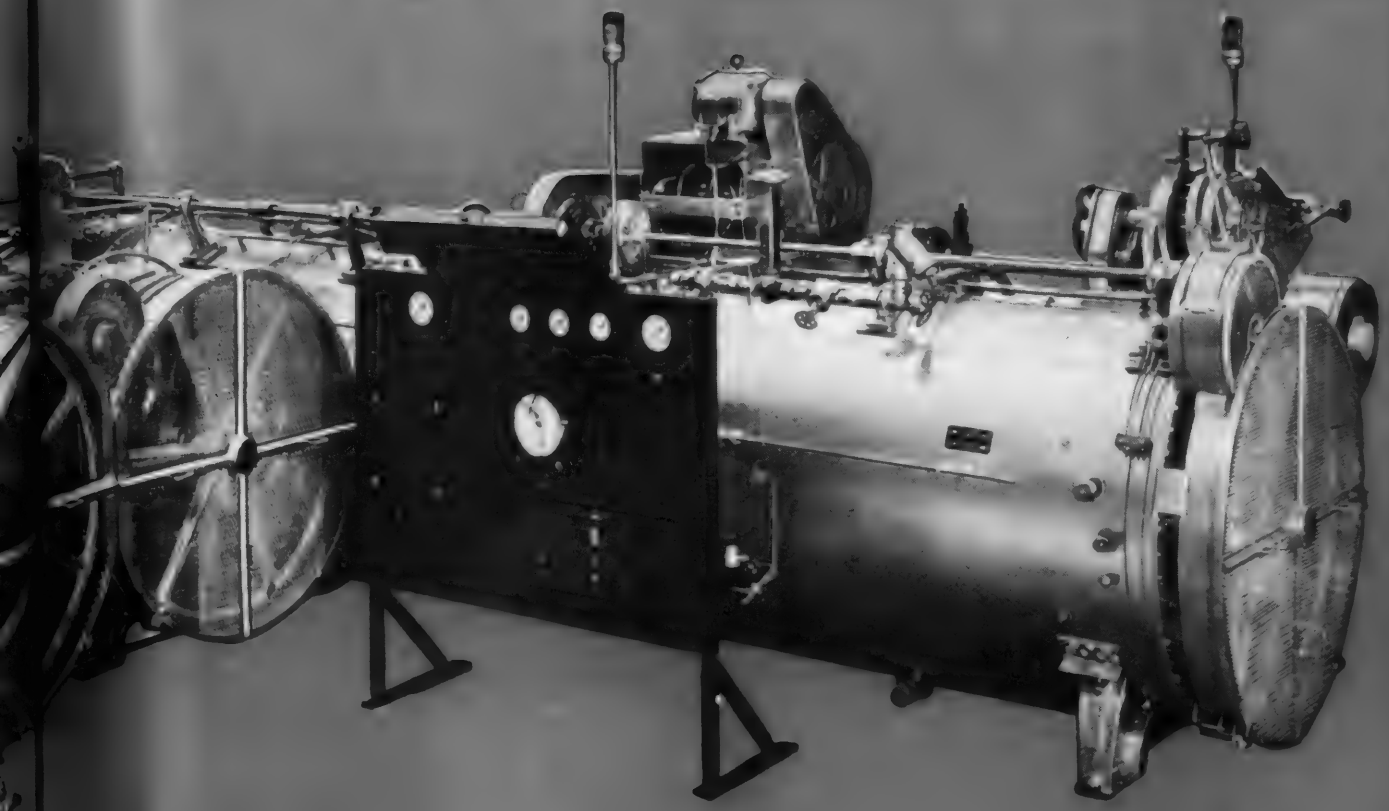

**IMC S.A. INTERNATIONAL MACHINERY CORPORATION**

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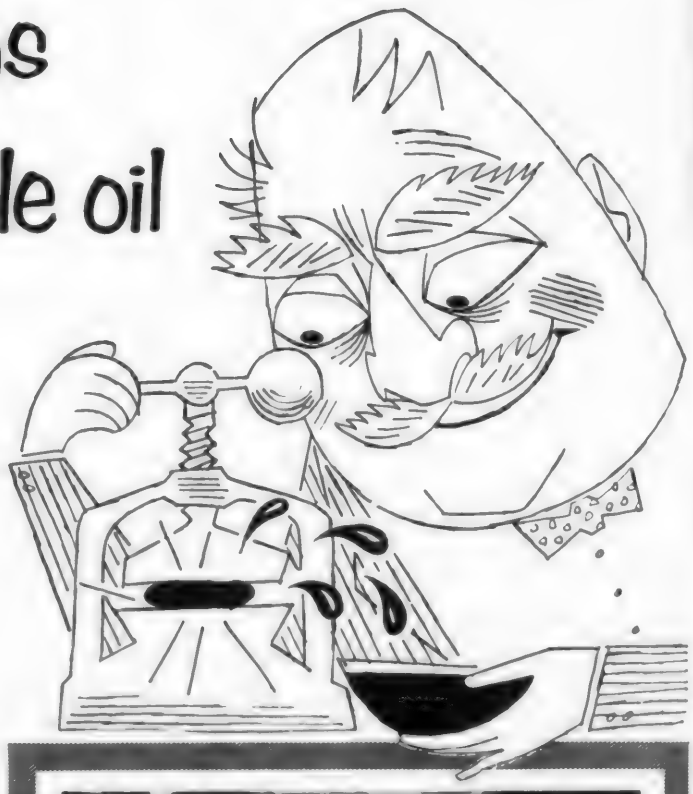
Representatives and licensees for Food Machinery and Chemical Corporation and other leading U.S. manufacturers of food processing and canning equipment.

# We save tons of vegetable oil every day...



## Sharples Low-Loss process now in use all over the world

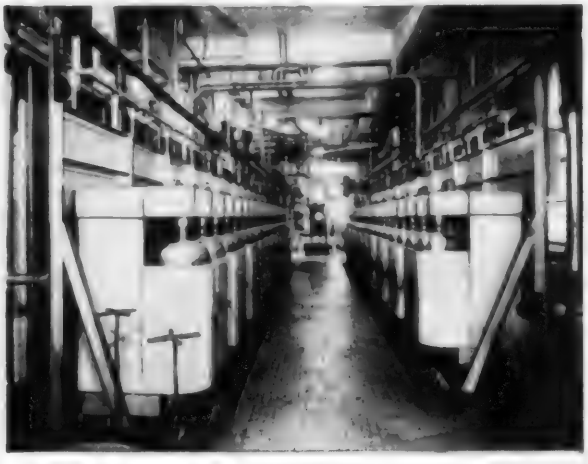
VEGETABLE OIL REFINERS in many different countries are saving tons of oil every day with the Sharples Low-Loss Vegetable Oil Refining Process. This really deserves its name. The savings are striking. Compared with Kettle refining 25%-40%. Compared with Caustic refining up to 15%.

Capital investment on a Low-Loss refining Plant is usually paid out of savings in less than 2 years and often in less than one !

How are these remarkable results achieved ? The basic idea is the application of the centrifuge in a continuous process. This idea has been backed by tremendous research, and development by Sharples including full scale development plants.

Today over two hundred plants are in operation each engineered to the specific requirements of individual plant conditions. But all of them have these common advantages. The oil produced is of best possible colour and quality. This quality is easily maintained without highly skilled control. The power requirements are much less. And operating costs are low.

**Sharples are always ready to advise on any processing problem whether it's about a complete process or a single machine. Write to address below or 'phone Camberley 2601 and talk to Francis Hooley about your problem.**



*A typical Sharples Vegetable Refinery. Write for Bulletin No. 1273F for further information on this process.*

# SHARPLES

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*'Phone:* Camberley 2601
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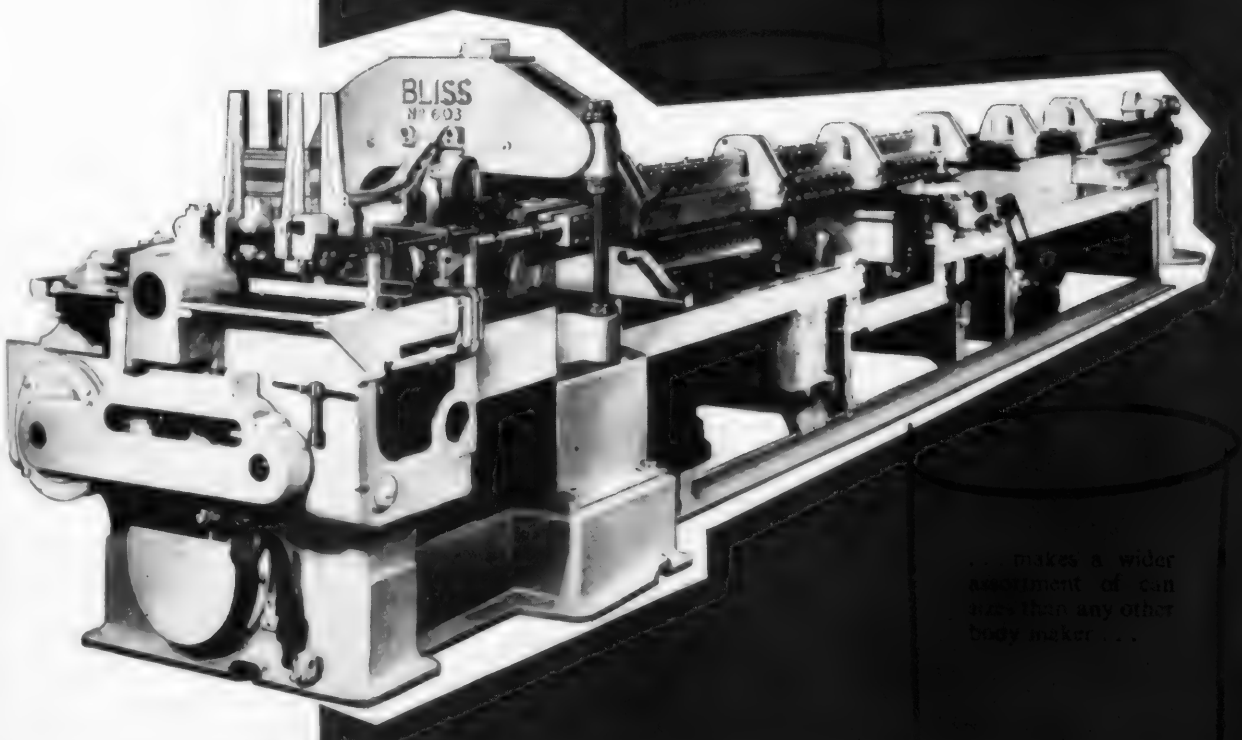
# The New Bliss 603

## UNIVERSAL BODYMAKER




... makes a wider assortment of can sizes than any other body maker ...

*This remarkable versatility makes the Bliss 603 ideal for packers who use many different can sizes.*

... turns out bodies as large as 6.3/8" diameter and 5.9/16" high, or as small as 2.1/2" by 2.1/2" by 1.1/2" requiring standard change parts.

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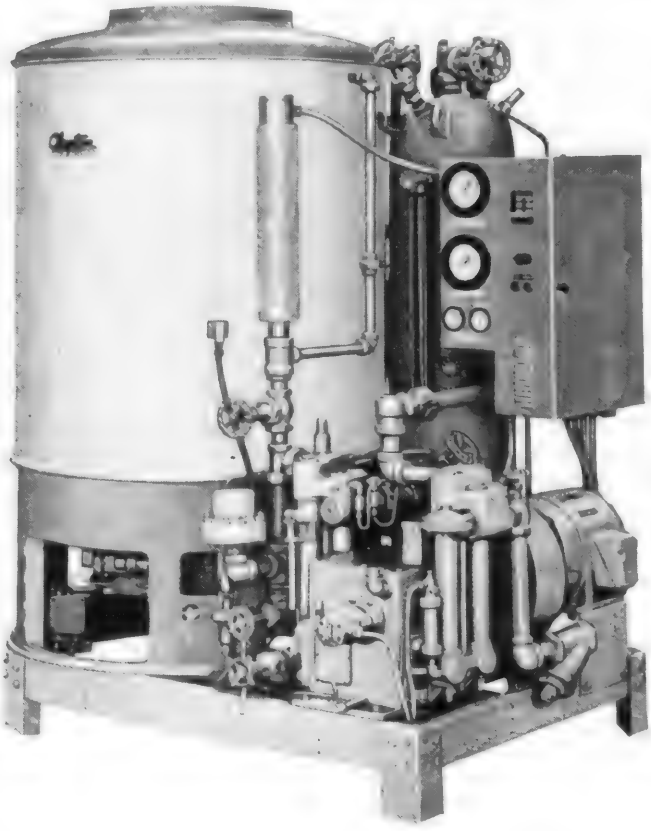
Clayton

# Fully automatic oil-fired

# STEAM GENERATORS

## give *steam instantaneously*

for heating, processing and other auxiliary services with:—



- ★ reduced fuel costs
- ★ immediate automatic operation from manual cold start
- ★ full operating pressure reached in less than five minutes from cold start
- ★ automatic adjustment to steam requirements
- ★ safety, minimum maintenance and easy to service
- ★ spares and service throughout the world

Clayton Steam Generators are available with capacities ranging from 429 lb/hr. to 4600 lb hr. and can be supplied for firing by fuel oil of 220 or 950 secs. viscosity (Redwood No. 1).

*TECHNICAL PUBLICATION AVAILABLE ON REQUEST*

## THE VULCAN FOUNDRY LIMITED

**NEWTON-LE-WILLOWS, LANCASHIRE**

Telephone: Newton-le-Willows 3641

*Member of The English Electric Group of Companies.*

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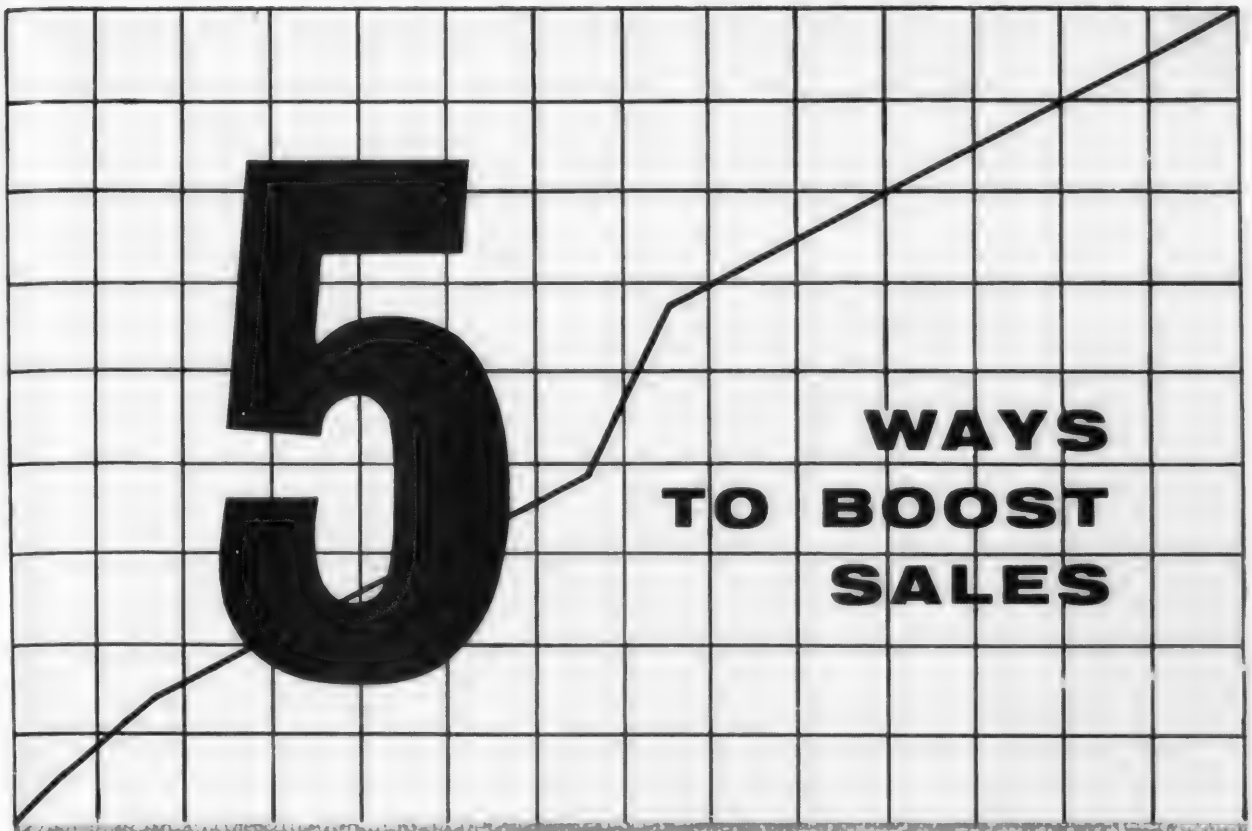


**1** REIGATE Brand **NUT FLAVOURS**
True to type—Coconut, Hazel Nut, Almond, Walnut, Pistachio and Nuts & Wine.

**2** REIGATE Brand **VANILLA FLAVOURS**
—for all purposes. Highest grades from Bourbon Beans and also compounded flavours of quality.

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Gives that quality touch and real "Butter taste" to your products.

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Pure distilled oil with the same flavouring constituents as the finest Jamaica Rum. Free from alcohol, artificial preservative and colouring matter.

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Types for all purposes.

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**REIGATE SERVICE! DELIVERY** to all parts of the country every week by our modern fleet of vehicles. (*Collection of empties also made*).

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Month by month
Weston's are
proving that

# USING BUTTER PAYS!

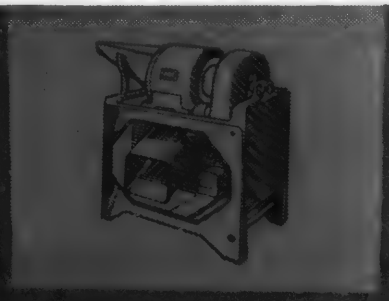
How much do you gain when you put butter in your product? Plenty. That's what Weston's felt when they brought out their new Golden Harvest Digestive Biscuits in the spring of 1959.

"We know that nowadays people really do want the best ingredients," they say. So they not only use butter in their product. They *say* so, good and big on the packet. And steadily rising sales are certainly proving them right, month after month after month.

So if, up to now, the price factor has made you hesitate to use butter in your own products, think again. It *pays* to use butter and to say so.

**ISSUED BY THE BUTTER INFORMATION COUNCIL**

MERCURY HOUSE, WATERLOO ROAD, LONDON S.E.1 *Telephone: WATerloo 5231*



For a high standard of hygiene in food manufacture

**LISSAPOL**

**the economical all-purpose liquid detergent.**

**VANTOC AL**

*(alkyl trimethylammonium bromide)*

**VANTOC CL**

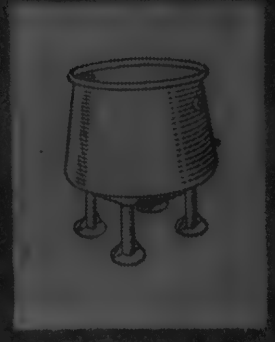
*(lauryldimethylbenzylammonium chloride)*

**Highly effective bactericides for microbiological control.**

The CL grade is more concentrated and has superior resistance to hard water and organic matter.

**VANTROPOL BQ**

**2-in-1 detergent-bactericide for cleansing and disinfecting crockery, cutlery and cooking utensils.**



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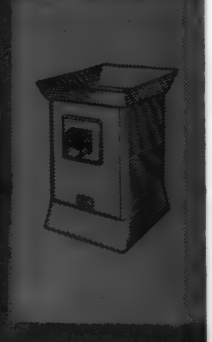
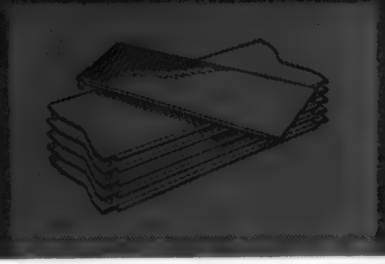
IMPERIAL CHEMICAL INDUSTRIES LTD.,
LONDON, S.W.1, ENGLAND





# Royal Assent!

The Queen of Hearts insisted on the purest ingredients in her jam tarts even at the risk of having them stolen. Purity of ingredients is now a basic requirement for all foodstuffs but Sturge have always maintained their own strict standards. Outstanding quality and flavour are the absolute rule in fine Citric Acid from Sturge.

# Sturge

FIRST NAME IN CITRIC ACID

Citric acid for jams and preserves, fruit squashes and carbonated drinks, ice-cream, confectionery, processed cheeses and other food products.

**CITRIC ACID BP**
**CITRIC ACID ANHYDROUS**
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# CLOSURE by KORK-N-SEAL

## for Meltonian Wren Limited

Kork-N-Seal make a wider variety of closures than any other British manufacturer, for glass, metal and plastic containers. They are part of United Glass Ltd., Britain's leading makers of glass containers, so your closures and glass containers can be produced and delivered together.

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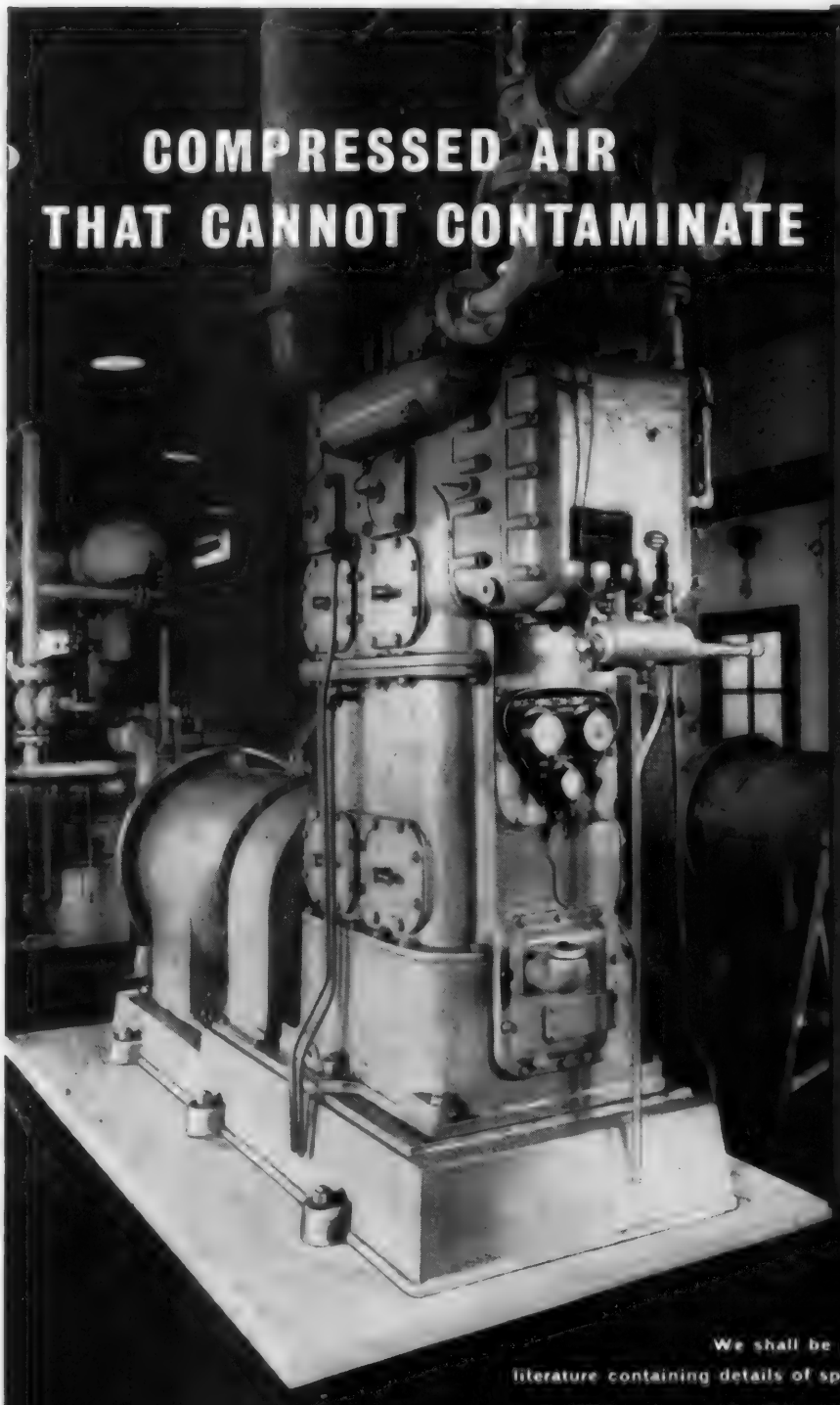
# COMPRESSED AIR THAT CANNOT CONTAMINATE



For processes such as aeration, which demand absolutely oil-free air, specify Worthington-Simpson

## type DA COMPRESSORS

The compression chamber is designed to operate without lubrication, thus ensuring complete freedom from oil contamination.

* Infrequent maintenance needed — all working parts easily accessible
* Automatic electric start and stop control available
* Pressures up to 150 p.s.i., capacities from 150 to 900 c.f.m

*Single- or two-stage models available*

We shall be pleased to send you technical literature containing details of specifications and performances.

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NEWARK NOTTS

PUMPS · COMPRESSORS · HEAT EXCHANGE EQUIPMENT

P 4007

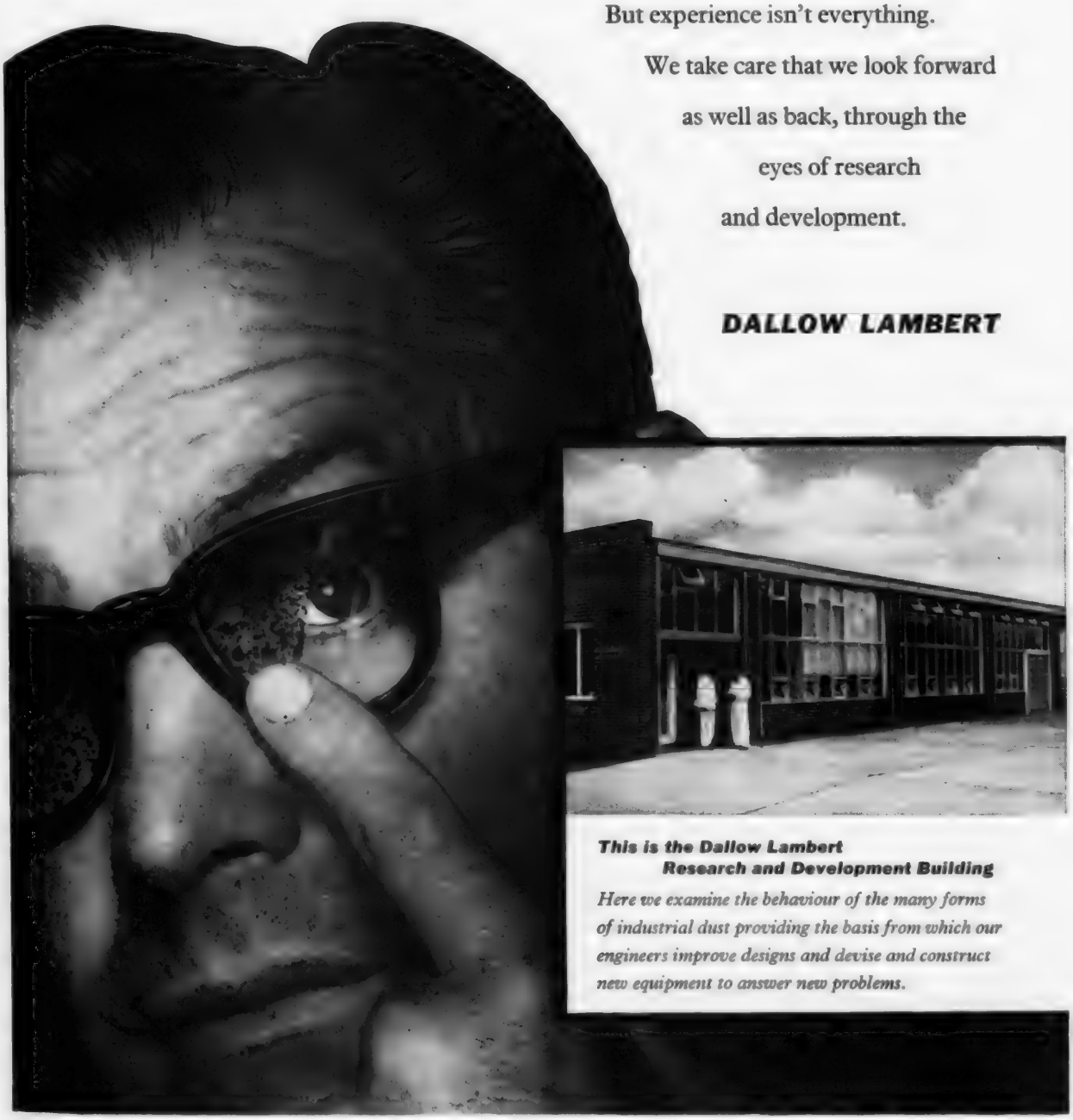
# see us for dust

Dust control is our one and only job and we've been at it now for over 40 years. That means we've built up a considerable experience of pretty well every dust ever created in industry.

But experience isn't everything.

We take care that we look forward as well as back, through the eyes of research and development.

**DALLOW LAMBERT**





***This is the Dallow Lambert Research and Development Building***

*Here we examine the behaviour of the many forms of industrial dust providing the basis from which our engineers improve designs and devise and construct new equipment to answer new problems.*

DALLOW LAMBERT LIMITED · THURMASTON · LEICESTER · Telephone: Syston 3333 (7 lines)

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B H T
Complies with the requirements of the Food and Drugs Act 1955, and the Foods and Drugs (Scotland) Act 1956.
SPECIFICATION: CRYSTALLISING POINT NOT LESS THAN 69.4°C
LEAD NOT MORE THAN 10 PPM
ARSENIC NOT MORE THAN 2 PPM
I.C.I. (Heavy Organic Chemicals) Limited, Billingham England.

# 'TOPANOL' BHT — a new food antioxidant

The *Antioxidant in Food Regulations, 1958*, permit the use of butylated hydroxytoluene in a variety of foods: 'Topanol' BHT is prepared with great care specially for this purpose.

'Topanol' BHT conforms with the requirements of the *Food Hygiene Regulations, 1955*, and other relevant legislation under the *Food and Drugs Act, 1955*.

'Topanol' BHT meets the following specification:—

| | | |
|---|---|---|
| Crystallising point | — | *not less than* 69.4°C. |
| Lead | — | *not more than* 10 p.p.m. |
| Arsenic | — | *not more than* 2 p.p.m. |

*Animal and vegetable oils and fats, and baked and fried foods containing these, are protected from rancidity at concentrations as low as 0.01% by weight—cooking temperatures do not destroy activity.*

*Paper and paper board wrapping impregnated with 'Topanol' BHT at low concentrations keep foods fresher by retarding rancidity at packaged food surfaces and on migrated films of fat.*

*The appetising appearance of food packs can be maintained by the use of plastic film wrappings (e.g. polythene) colour-stabilised and protected against embrittlement.*

*Natural and synthetic oil-soluble vitamins (e.g. in fish liver oils) and citrus and other essential oils are also the better for 'Topanol' BHT.*

A PRODUCT OF

I.C.I. HEAVY ORGANIC CHEMICALS DIVISION

*Full information on request*

IMPERIAL CHEMICAL INDUSTRIES LIMITED

LONDON, S.W.1.

H.50

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BCL POLYTHENE film
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Whether you need the world's most moisture-proof packaging film . . . or one which can withstand 400°F. . . . or a wrapper for quick-frozen food . . . or a material for boil-in-a-bag packaging . . . or a film which will dissolve in water . . . or standard films with that extra quality which comes from long experience and tremendous know-how, BCL can help you.
Whatever your products or projects, call in BCL——now.
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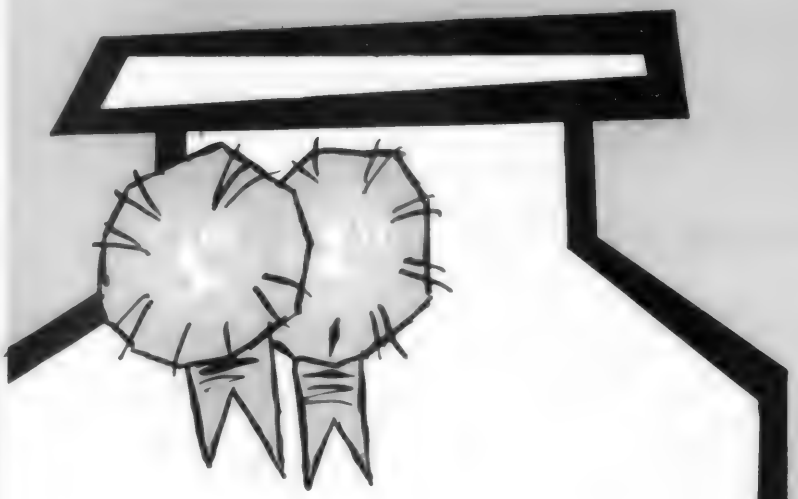
"Cellophane" is the registered trade mark of British Cellophane Limited and denotes the brand of cellulose film manufactured by them.

# Can you do better than best?



**Yes! Best (in the supply of Milk Products) used to be Golden Glow and Wilts United Dairies. Now they are one—**

## Unigate (Milk Products) Ltd

**So the availability, the service and the research are intensified—hence two of the best go one better to help you.**

**For Milk Powder in all its forms (Spray or Roller), Sweetened Condensed Milk (Full Cream or Skim), Evaporated Milk and, of course, Butter, Cheese and all other Dairy Products —whether you need them in tons, cwts., lbs., gallons or quarts—backed by an expert Advisory Service, phone or write to—**

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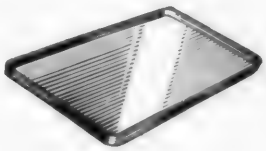
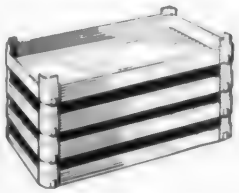
# HYGIENE puts YOU on OUR metal!

## ALUMINIUM

## SEALED CONTAINERS





Heavy gauge seamless bodies and lids with quick release steel toggles, cellular rubber gasket and drop-down handles. Ideal for transporting and storing.

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| Cat. No. SC 108 . . . . . | 2 galls. capacity |
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# *The Glastodon*

**EATING HABITS:** omnivorous (nothing disagrees with glass).
**COLOURING:** various (flint, pale, green, amber, blue, opal).
**HABITAT:** United Glass — the place to go for the best glass packaging service:

- The finest in modern glass package design and research.
- Containers and closures made together to suit each other perfectly.
- Expert help and advice on any glass packaging problem.
- The right type of container for every kind of product.

*Glass makes the finest containers of all — and United Glass makes them by the million. Come and see how we can help you.*

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# For sure protection of canned foodstuffs

## IT'S THE Lacquer THAT COUNTS

*Yet another addition to the Coates range of Preservex lacquers. The Lacquer to guard against blown cans, can corrosion, and sulphur staining—in fact, to be recommended for all types of canning.*

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*FOR* **CLEAN** *AND* **ACCURATE** *FILLING OF PRODUCTS WHICH FLOW OR COULD BE 'JUG FILLED'*

*USE A* **CALEB-DUCKWORTH FILLER**

ILLUSTRATED
THE S.T. MODEL

JAMS · JELLIES
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SOUPS · CREAMS
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*COMPACT*
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*EASILY CLEANED AFTER USE*
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There are two models of the CALEB-DUCKWORTH FILLER the "Straight Through" and the Rotary Feed.

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A THOUGHT FOR FOODS

Protein additions?

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MUNTON & FISON LIMITED

CEDARS FACTORY STOWMARKET SUFFOLK

*Maltsters for more than a Century*

# Versatility

## BEER IN CANS... another new use for tinplate

Tinplate is changing the traditionally conservative habits of beer-drinkers. Already in Britain leading brewers are packing no fewer than one hundred and eighteen brands of beer in cans.

Research and development by The Steel Company of Wales have helped to make possible this further example of tinplate's increasing versatility. In addition to the special type of tinplate required for canning beer, The Steel Company of Wales produces a wide variety of grades and qualities to suit many specialized applications.

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# THE STEEL COMPANY OF WALES LIMITED

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PAT-A-CAKE, PAT-A-CAKE

# Here comes the Bakers man!

in one of the new

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PETROL OR DIESEL

## FORWARD CONTROL ¾ TONNERS

This standard factory-built Commer ¾ ton van has been successfully adapted for the delivery of bread, and demonstrates the remarkable versatility of these fine vehicles. Incorporating an all-steel driver's compartment with panoramic windscreen, independent front suspension, silent synchromesh gearbox, hypoid rear axle and 'easy-ride' rear springing, the new Commer van can be supplied with interior fittings to meet user's special requirements.

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Milk Powders

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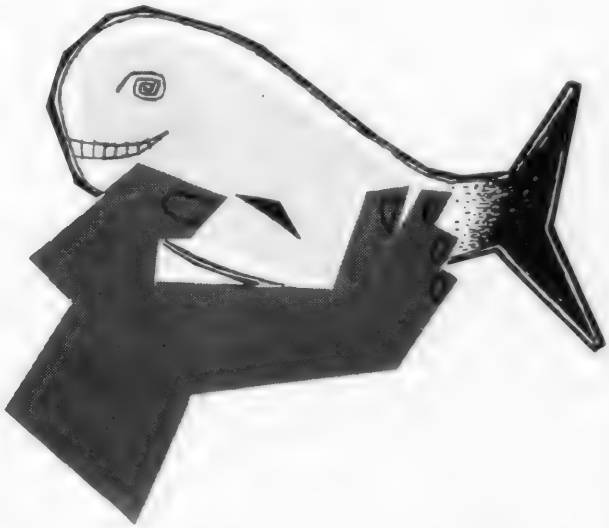

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Overhead conveyors
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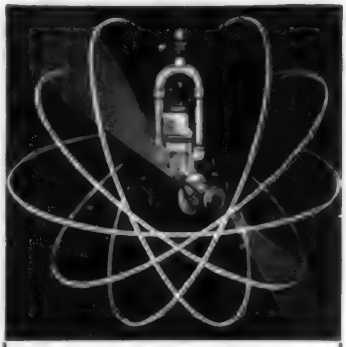
The high pressure jet of the C.P-Sellers Hydraulic Cleaner provides a scrubbing action that completely removes dirt, grease, slime and mould growths that normal cleaning cannot touch.

Detergents can be incorporated and metered economically when required.

Hundreds of these units are being operated in this country and throughout the world cleaning machinery, tanks, bins, conveyors, floors, etc.

Operates with cold water and steam from 5 p.s.i. upwards, gives hot water discharge pressures ranging from 50-400 p.s.i.

**Specialists in Heavy Plant Cleaning Equipment. Manufacturers of Continuous Food Processing Plant, Stainless Steel Fabrications, etc. Concessionaires for Sabroe Soft Ice machines and R.E.C. Stainless Steel Positive Pumps (50-10,000 g.p.h.)**



**INTERIOR TANK CLEANING**

The C.P-Sellers Rotor Jet cleans the inside of tanks completely, safely . . . automatically! It revolves in a spherical pattern, discharging high pressure hot or cold jet streams which scrub all inner surfaces.

**C.P. EQUIPMENT LTD**

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Realm stainless steel fittings are designed and manufactured specially for liquid food process lines.

To the British Standard 1864 and the American I.A.M.D. cone seat standard in sizes 1″ to 3″.

We invite enquiries for the manufacture of special items.

*ALL REALM fittings are made of stainless steel 18/8/3.*

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The machines illustrated are four of a total of six lolly mould washing machines supplied by Dawson Bros. Ltd., to T. Wall & Sons (Ice Cream) Ltd. . . . The moulds are subjected to an intense two stage spraying and jetting treatment consisting first of a prolonged hot water wash which thoroughly cleans the top and underside of the moulds, followed by an overall fresh cold water rinse. The machines are made throughout from stainless steel and all parts including pumps, sprays and jet boxes are easily accessible for cleaning down and maintenance.

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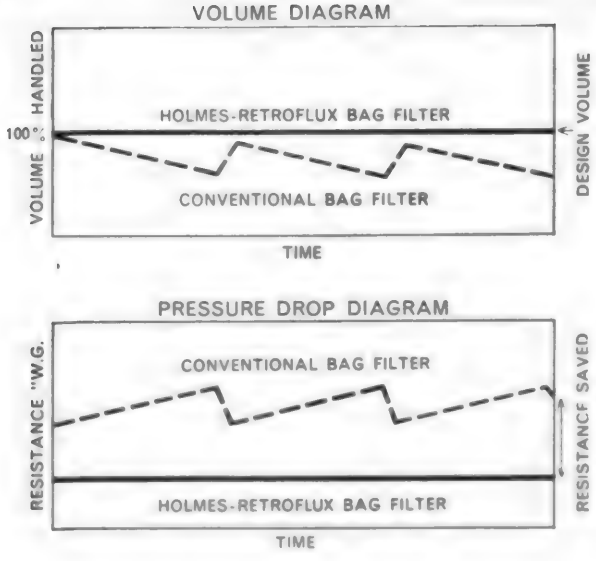
The Holmes-Retroflux Bag Filter is of advanced design and offers numerous advantages for those applications where high dust burdens are encountered and/or dusts of an adhesive nature have to be collected.

*A Retroflux Bag Filter installation collecting valuable dust at a chemical works.*

## THE FILTER THAT WORKS AT CONSTANT PRESSURE AND AIR VOLUME




- **Constant low resistance— reduced power consumption.**
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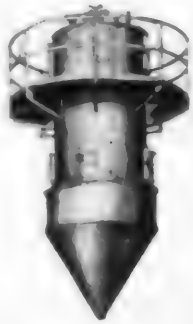
- **Low maintenance costs— no shaking or valve mechanisms.**
- **Continuous cleaning of entire surface area of filter bags.**
- **Efficiency—in excess of 99% for all particles.**

Holmes-Standard Bag Filters are also available and are recommended for less arduous duties.



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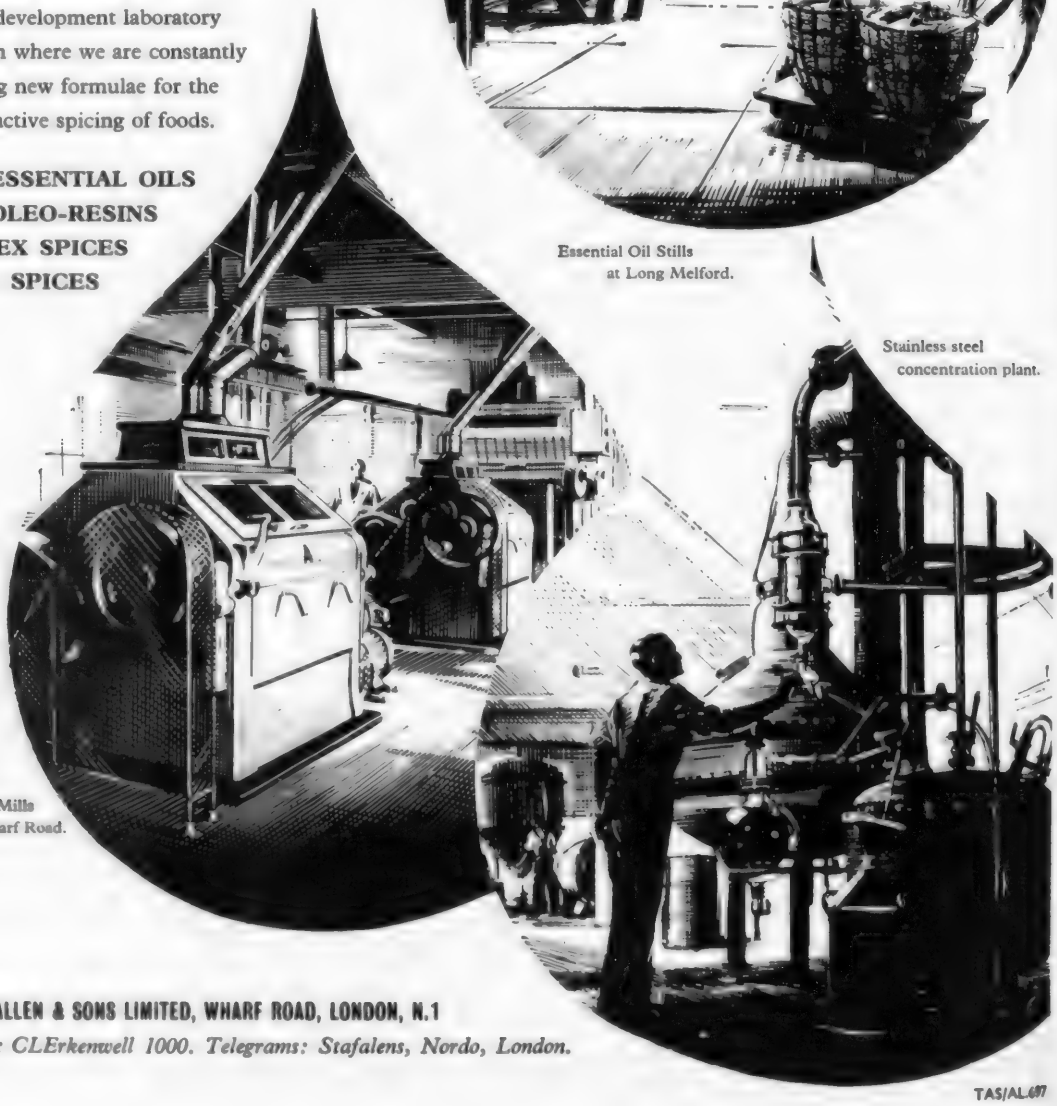

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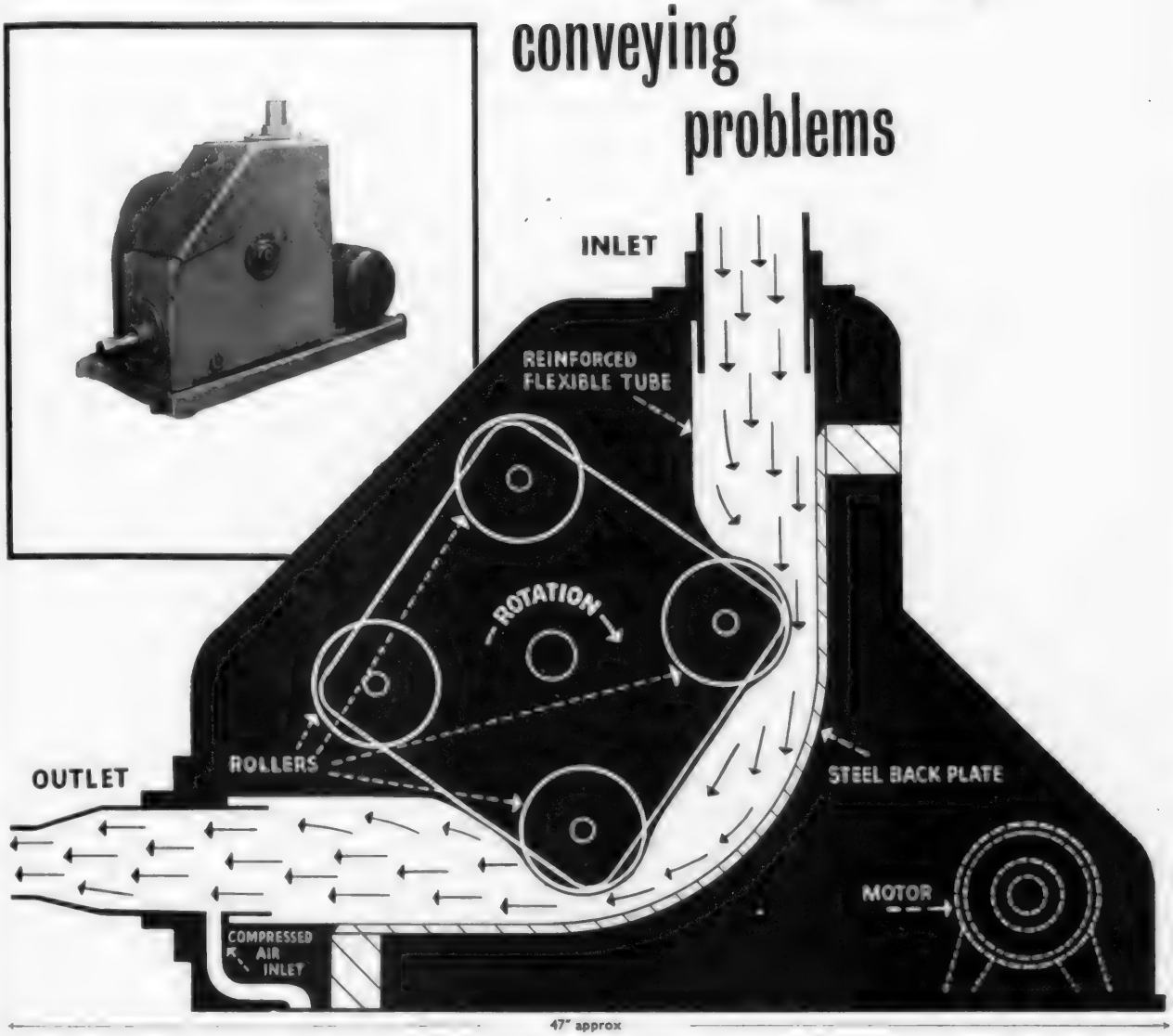


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[E]

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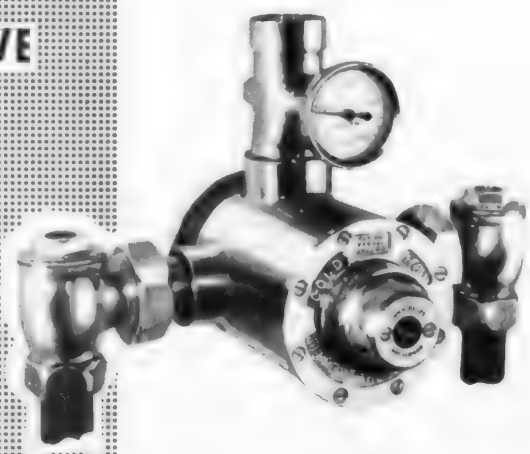

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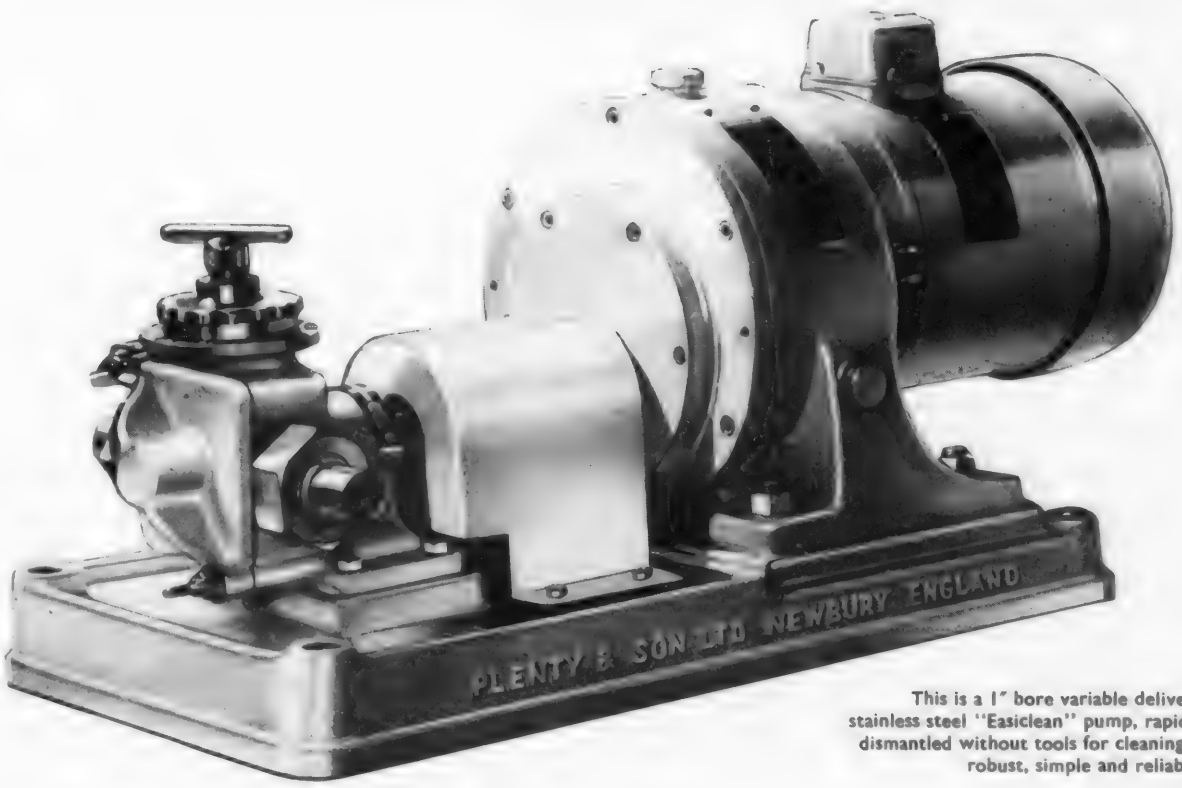


This is a 1" bore variable delivery stainless steel "Easiclean" pump, rapidly dismantled without tools for cleaning—robust, simple and reliable.

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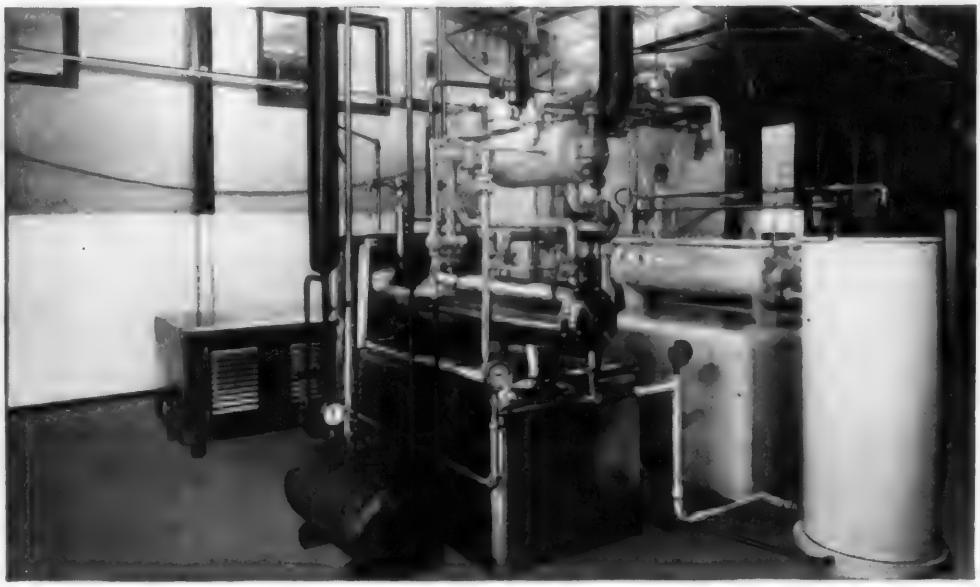
# Modern Margarine Making



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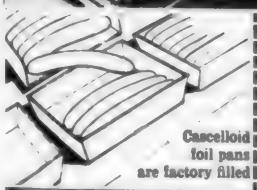
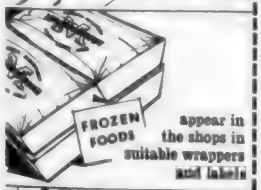
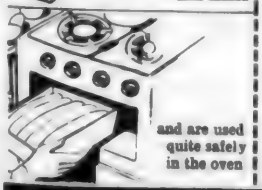


Cascelloid foil pans are factory filled




appear in the shops in suitable wrappers and labels



and are used quite safely in the oven

## 'oven-ready' low-cost aluminium foil pans

**Leading food manufacturers like Lyons have found that these gleaming, seamless, leakproof pans are perfect for frozen and pre-cooked foods. Cheap in price, Cascelloid foil pans have a smooth surface and seamless hygienic corners. They can be deep-frozen or hot-filled and used for re-heating or cooking the contents after sale.**

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*Cascelloid aluminium foil pans are available in foil gauges to suit the product and in a number of standard sizes ranging from 4½" x 2½" x 1" deep to 6" x 10" x 1¾" deep. Non-standard sizes are produced for large orders.*

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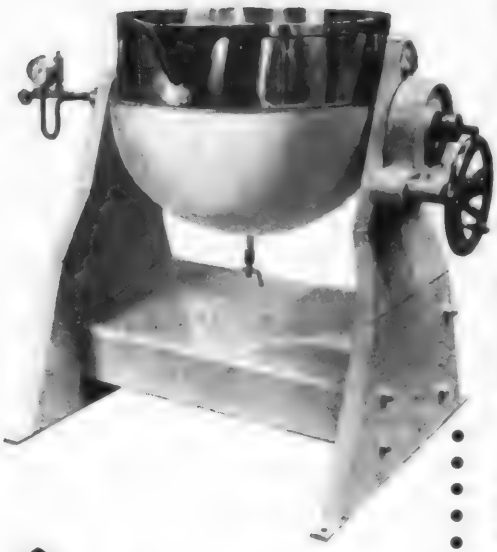
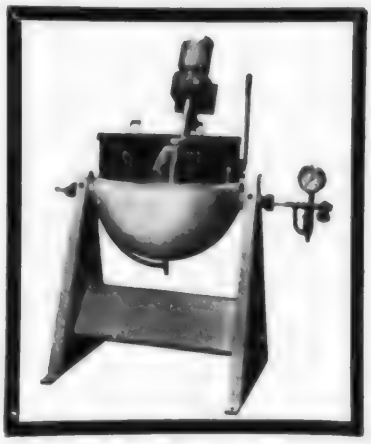


# WHY THEY CHOOSE TRF TILTING PANS



75 gallon Tilting Jacketed Sugar Boiling Pan in FMB quality stainless steel with MS jacket. Pan supports splayed to suit customers supporting plinth.

25 gallon Stainless Steel Jacketed Tilting Pan. ½ h.p. motor unit with removable type agitator. Loose drop-on lid. Stainless steel inner pan with hemispherical bottom, mild steel outer jacket of same contour.

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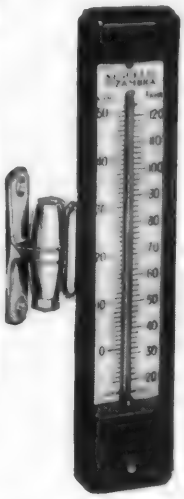
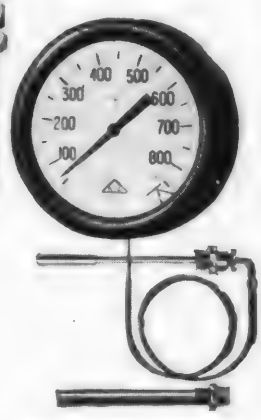


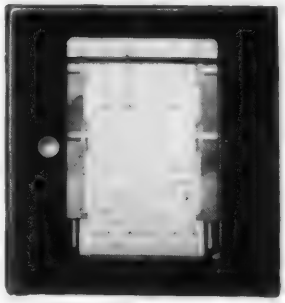
Room Thermometer
with plastic case

Brass-cased Tank and
Pipe Thermometer

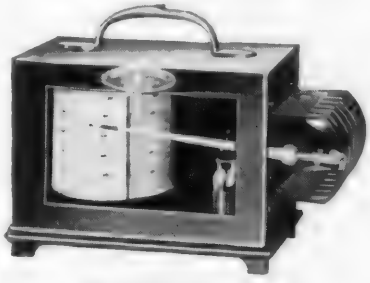
4" Mercury-in-steel
Dial Thermometer,
Rigid Stem Type



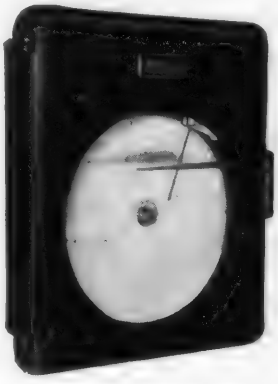
Distance-type Mercury-in-
steel Dial Thermometer



Resistance Thermometer
Recorder



Bi-metallic Recording
Thermometer



Mercury-in-steel Disc
Chart Recorder

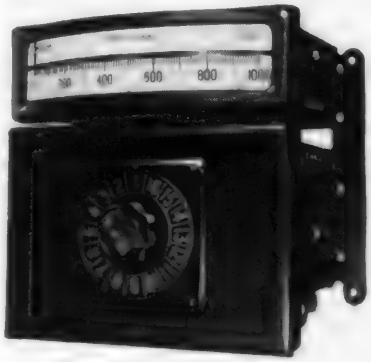


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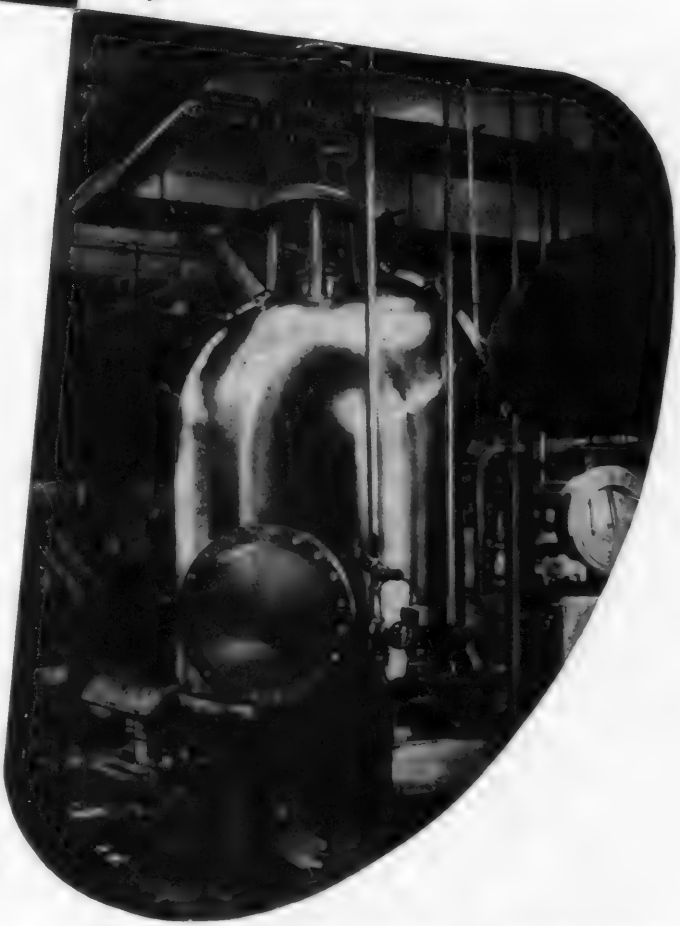
*Illustration shows Stainless Steel Jacketed Pans which are available from stock.*

# ..FITNESS FOR PURPOSE



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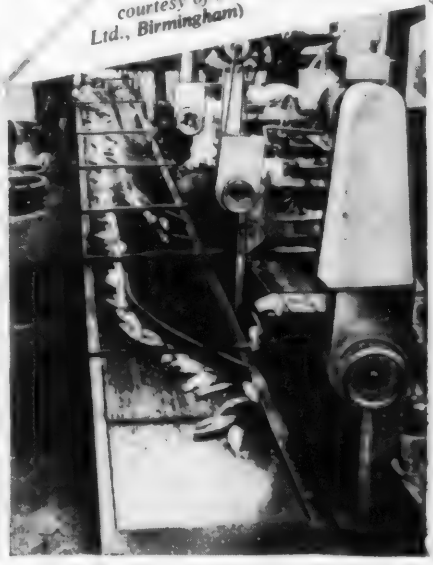
Cake packing on a 'Motaveyor' (by courtesy of Knightsbridge Cake Limited, Manchester)

Fruit bottling on a 'Motaveyor' conveyor (by courtesy of J. Mawdsley Ltd., Wigan)



Scandura conveyor in a fish canning factory (by courtesy of Fisher & Ludlow Ltd., Birmingham)

As the pioneers of P.V.C. covered conveyor belting British Belting & Asbestos have supplied their SCANDURA belting for many varied applications. Due to its resistance to contamination and its hygienic qualities SCANDURA has become the obvious choice for food conveyor belting. Its lasting qualities had already been proved in food factories two years before its first introduction in Britain's coal mines in 1948, and its fire resistant properties have brought a hitherto unknown safety margin where conveyor fire hazards originally existed. SCANDURA is available now, in varying widths and thicknesses to suit all applications.

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Volume XXXV. Number 11 Editor: Anthony Woollen, B.Sc., A.R.C.S., A.R.I.C. November 1, 1960



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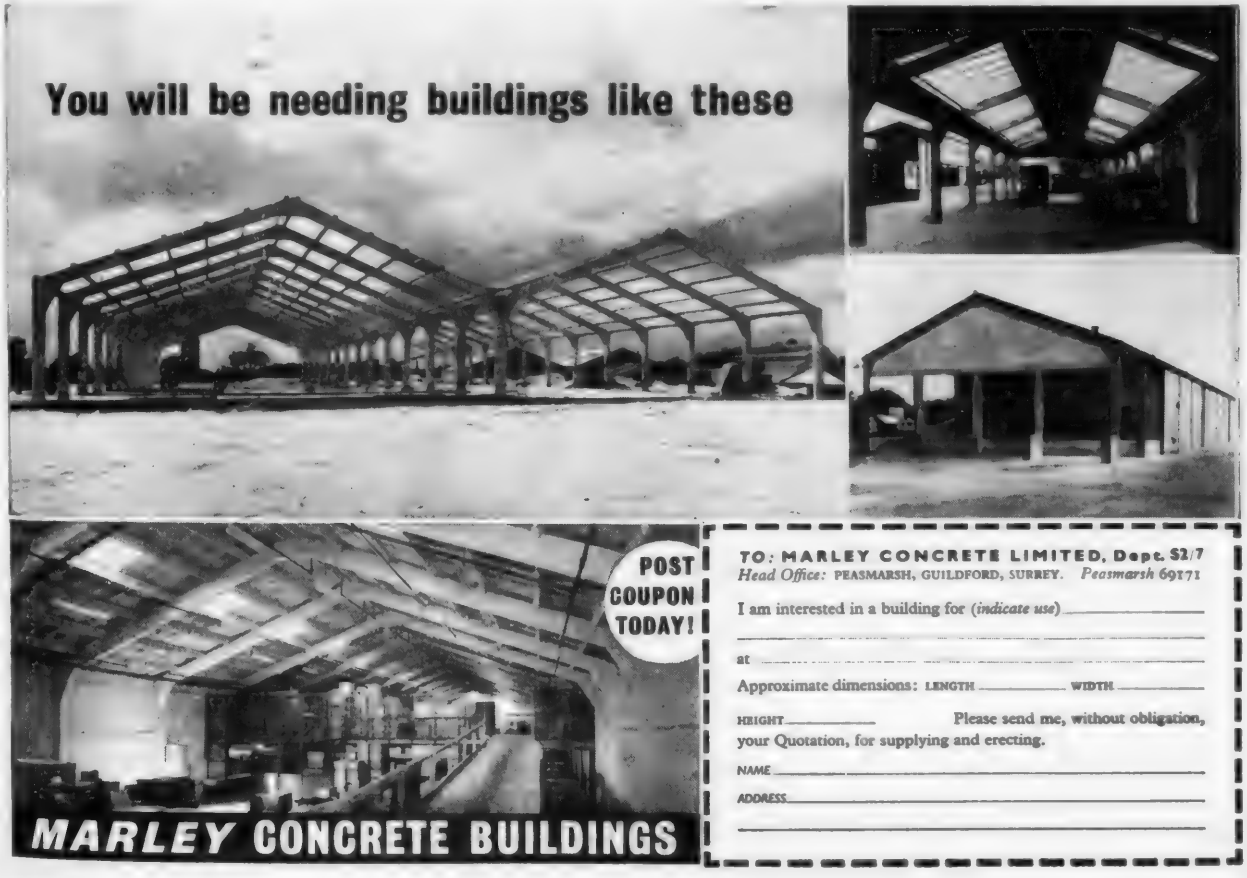
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Number 27 November 1960

# Specialised Products (No. 7)

LODERS and NUCOLINE LTD.

**INFORMATION BULLETIN**

*This advertisement is one of a series of Information Bulletins issued by Loders & Nucoline Ltd. Copies are available, together with a folder, on request to Loders & Nucoline Ltd., Unilever House, London, E.C.4.*

## HYCOA 5

**Description**

Hycoa 5 is a bland, white vegetable fat which is tasteless and odourless, and melts relatively quickly in the mouth. It is very stable when stored under normal conditions.

**Uses**

***In Biscuits.*** Hycoa 5 is used in biscuit cream fillings especially if a moderately hard fat is required, as in the case of high speed creaming machines. It is also used as a component of biscuit dough fat mixtures.

***In Sugar Confectionery.*** This fat is extensively used in toffees and caramels boiled at a temperature below 255°F. It imparts body to the toffee and gives good eating qualities without leaving a waxy taste on the palate. Hycoa 5 is also used in the manufacture of soft-centres, fudge and many continental specialities.

***In Chocolate.*** Substitute Chocolate for low-priced Easter Eggs and moulded novelties with a limited shelf life is made with Hycoa 5 together with low fat-content cocoa powder. Bakers' coatings, which are required to be of a brittle type, are made with Hycoa 5. When Hycoa 5 is mixed with Hycoa 1 or Nucoline A.H.B. it produces a softer-cutting cake compound. Coatings made with Hycoa 5 have an adequate shelf life during which a good flavour is retained.

**TYPICAL PHYSICAL CONSTANTS**

| | |
|---|---|
| Iodine Value | 4.0 |
| Sap. Value | 244.0 |
| Slip Point | 38.0°C. |
| Complete Fusion | 43.0°C. |

## HYCOA 6

**Description**

Hycoa 6 has similar characteristics to Hycoa 5 although it is a harder fat with a somewhat higher slip melting point.

**Uses**

***In Sugar Confectionery.*** This fat can be used to replace Hycoa 5 where a harder fat is required and possibly where the product is exported to tropical countries.

***In Chocolate.*** Bakers' coatings may be made with Hycoa 6 where a brittle hard product is required. It can be softened by the addition of Hycoa 1 or Nucoline A.H.B. if necessary. Hycoa 6 is used in the manufacture of chocolate vermicelli for cake decoration.

**TYPICAL PHYSICAL CONSTANTS**

| | |
|---|---|
| Iodine Value | 1.0 |
| Sap. Value | 244.0 |
| Slip Point | 41.0°C. |
| Complete Fusion | 47.0°C. |

## TORCOA

This fat is a hydrogenated all-vegetable product which is similar to Hycoa 5 and Hycoa 6 but it has a higher slip melting point and is very suitable for use in countries with tropical climates or for home trade in very warm weather.

**Uses**

This fat has been designed primarily for inclusion in moulded substitute chocolate and coatings for use in hot climates.

**Notes**

Our Technical Service Department has extensive experience in all phases of use of these fats. Full details of any specific use together with recipes and methods of manufacture can be obtained on application.

**TYPICAL PHYSICAL CONSTANTS**

| | |
|---|---|
| Iodine Value | 3.0 |
| Sap. Value | 240.0 |
| Slip Point | 43.0°C. |
| Complete Fusion | 47.0°C. |

LN 71-8058

FOOD
Manufacture

Vol. XXXV, No. 11 November 1, 1960

## *International food standards*

If a dominant theme can be said to have emerged from the papers read at the Pure Food Centenary celebrations, it was the hope that one day international standards for pure food might be achieved. The possibility was referred to by Lord Waldegrave during his opening speech, mentioned *en passant* by Mr. E. B. Hughes, and elaborated by Dr. N. C. Wright.

World population is increasing, living standards are rising. Growing political consciousness of the younger nations, the spread of scientific ideas and a loosening of the barriers of trade are pointers to a world community of nations which might conceivably arise in the dim and distant future if East and West can resolve their differences without slinging nuclear rockets at one another. It is therefore not in accord with universal harmony that of 82 food colours permitted in 22 countries, only one colour should be permitted in all of them. As Dr. Wright said, the first task in ironing out the differences in food legislation between different countries is to keep track of what each country is doing and to keep other countries informed. In this connection, a series of national studies on food additive control systems has already been started, and F.A.O.'s regular bulletin, *Current Food Additives Legislation*, in its first four years of existence has abstracted some 300 food law amendments in the field from about 50 different administrations.

In Dr. Wright's opinion the ultimate aim should be legislation on a regional basis rather than a supra-national one, for conditions, climate and food patterns differ too widely, and will continue to do so, for the latter to be successful. There are already in existence the beginnings of regional projects which, if subscribed to by the nations concerned, can help to establish regional standards and definitions. In Europe, the Common Market will, it is believed, shortly issue unified regulations on food colours binding upon the Six.

Yet in certain spheres work can be done on a world-wide basis, and Dr. Wright gave as an example the work on designations, definitions and standards for milk and milk products which the F.A.O. began in 1957. Starting from recommendations submitted by the International Dairy Federation, F.A.O. set up a committee to draft recommendations to governments in such a way as to allow their adoption without recourse to "Treaty procedure." The three meetings of the committee have resulted in a "Code of Principles concerning Milk and Milk Products" which has been accepted by some 30 governments.

In work of this kind, the aim must be to formulate recommendations which can be adopted by governments and industries as binding without the need for going through cumbersome legislative procedure.

## *Inefficient packs*

A SPEAKER at one of the Centenary paper-reading sessions commented (and how we sympathise) on the diabolical properties of some food packs, making them next-to-impossible to open. Incredible as it may seem, many packs on the market seem designed quite without the consumer in mind. There are those well-known and exasperating processed cheese wedges wrapped in foil; a simple tear-tape would solve that opening problem. Then there is a well-known biscuit pack consisting of a box of corrugated board with an overwrap of paper; if the overwrap is opened at one end only, the biscuits are inaccessible, and if the wrapper is torn off the box disintegrates completely.

Sweet boxes so efficiently wrapped in cellulose film that they defy opening are legion. This material is tough and resists all attempts to tear it off by brute force; its clarity and thinness makes the sealed edge, where an opening might be started, quite invisible.

Sardine and meat tins are often provided with a lug mating with a slotted key; after a turn or two the lug frequently breaks off, making recourse to a can-opener necessary. This effectively mangles the contents to a mess guaranteed to turn the stomach of all but the hungriest.

Everyone is familiar with the narrow-necked bottle of tomato ketchup which sullenly refuses to pour when it is first opened. The luckless eater urges the ketchup by tapping the bottle's base gingerly, to no avail; exasperated, he thumps the bottle, whereupon a good half of the contents precipitate themselves violently over his dinner and the surrounding tablecloth.

A well-designed pack not only provides efficient protection for the contents but is easily opened. In the latter respect we lag behind the Continentals, many of whose packs have that touch of genius which lifts them from the good to the brilliant. British packing materials are second to none; it is in pack design that we so often fall down.

## *Corrosion prevention*

AT OLYMPIA, London, from November 29 to December 2 is being held the *Corrosion and Metal Finishing Exhibition*, and we commend this to our readers, for corrosion is of vital concern to all who use machinery and equipment of any kind, and house it in a factory building. What corrosion costs British industry is very difficult to estimate; Dr. J. C. Hudson, recently retired head of the Corrosion Section of the British Iron and Steel Research Association in London, has calculated that the cost of protective processes applied to steel in the U.K. during the year 1957 was roughly £200 million. About half this sum was spent on painting, and one fifth on galvanising; tinning cost about £10 million and other processes about £55 million.

It is reckoned that £4 out of every £10 the farmer spends on repairs or replacement of his machinery and implements is due, directly or indirectly, to rust. It has been estimated that car owners can reckon valve corrosion costs them £2 10s. per thousand miles.

As an example of the way in which iron can resist corrosion in a dry atmosphere, the Pillar of Delhi, the Quatb Minar, an iron column 20 ft. high, made by Hindu metallurgists more than 1,600 years ago, has resisted extensive corrosion. This phenomenon is still not yet fully understood, though eventually research may lead to a better understanding of this remarkable corrosion resistance and the duplication artificially of such behaviour among structures not so fortunately placed.

An example of the application of modern techniques to save a severely corroded structure is the Palm House at Kew. Such was the extent of corrosion in this building, built in 1845-48 and for a long time the largest glass house in the world, that in 1952 the Ministry of Works thought of erecting an entirely new building until the inevitable question of finance knocked that project on the head. The framework of wrought iron ribs and glazing bars, to a curved section with vertical clerestories, carries 47,700 sq. ft. of glass. The building also contains a certain amount of cast iron in columns, staircases, balconies and balustrades. Temperature and high humidity did their worst. In some instances the main supporting ribs were partially eaten through by rust. However, it was decided to save the building by repair work.

All ironwork surfaces were derusted and cleaned with mechanical chisels and wire brushes, while needle guns were used on some of the broader surfaces. A technique was developed for welding steel plates to cast iron. Underfloor short cast iron columns which were severely corroded were replaced, using cast aluminium which had been given anti-electrolytic treatment. To eliminate any rust residue, a primer wash of resin-based phosphoric acid was given to the iron, followed by a rust-inhibiting primer coat, an undercoat, and two finishing coats of specially prepared paint. The Palm House was saved.

## *Facts about the Exhibition*

THE PURPOSE of the Exhibition is to attempt to reduce the expenditure of over £600 million each year which, as far as can be estimated, corrosion is costing the U.K. alone, and to make clear to industry the ways in which this can be achieved.

This year the Exhibition will be probably the world's largest display of anti-corrosion and metal finishing products and services. Over 100 stands will be open to visitors, and experts from such organisations as the Department of Scientific and Industiral Research (D.S.I.R.) and the Tin Research Institute will be available to answer visitors' questions on corrosion in their respective fields.

Official support is backed by symposia arranged by the Plastics Institute and the Corrosion Group of the Society of Chemical Industry, who will occupy the Empire Restaurant on the afternoons of Tuesday, November 29, and Thursday, December 1, respectively. Papers to be read and discussed at the Plastics Institute Symposium are "Protective Packaging —Engineering Applications" (G. Gonda), "Plastics as Heavy Protective Coatings" (N. Vinson), and "Fabricated Plastics and their rôle in Combatting Corrosion" (K. V. Pepper). Subjects at the Corrosion Group Symposium will be "Influence of Water Movement on Corrosion; Ferrous Materials" (Dr. G. Butler of the National Chemical Laboratory) and "Influence of Water Movement on Corrosion; Non-ferrous Metals" (Dr. N. V. Nowlan of the Admiralty Materials Laboratory). The symposia are, of course, open to visitors.

Film shows will be held on three of the four days. The unique and varying programme covers corrosion, metal pretreatment, coatings, etc., and is expected to be most informative for many visitors. Film titles include "Metal Spraying," "Flame Cleaning—Removing Rust Prior to Painting,"

"Corrosion in Action," "Must it Rust?" and "No Rust Here."

The Exhibition covers paints, plastics, rubbers, galvanising, anodising, electroplating, metal cleaning, colouring, polishing, paint application, phosphating, plastic coatings, metal and paint spraying, resistant metals, cathodic protection, water treatment, inhibitors and protective systems, de-rusting and de-scaling, corrosion resistant plant, linings, pipelines and protection, acid resisting floors and tanks, specialised packaging, and corrosion and metal finishing testing apparatus. Every important feature of the former Corrosion Exhibition has been retained.

## *Doping the meat*

THE POROSITY of freeze-dried food, especially meat, offers possibilities for the easy introduction throughout the bulk of the food of texture-improving enzymes and flavouring agents. Work has been in progress at Aberdeen on impregnating freeze-dried meat with tenderisers which, because of the absorbent and spongy nature of the material, can impregnate the whole bulk instead of affecting the surface layers only. When flavours and colours are likewise introduced, the possibility can be clearly envisaged of transforming a tough low-grade cut into a rare and juicy steak so appetising that the unsuspecting diner will imagine he has been given a piece of choicest rump.

We can imagine what the advocates of natural food would have to say about such goings on. But the economic aspect has still to be considered. By the time dehydration, tenderising and flavour addition have been taken into account, it may well be as cheap, if not cheaper, to buy the most expensive fresh meat. But the process no doubt has possibilities for food processors, especially producers of complete dehydrated meals. The outlook for such products is promising and we have no doubt that much will be heard of these new products before long.

## *Too many samples?*

HAS the time come for the public health authorities to reduce the amount of money they spend on sampling the nation's food and drink? In the view of Mr. James Ferguson, Aberdeenshire sanitary inspector, it has. He thinks the taking of an almost astronomical number of food samples, the vast majority of which are unimpeachable, is a waste of time and money. His argument is that as the small number of samples which offend do not affect human health in any degree, the position has now been reached that the public health authorities are more concerned with seeing that purchasers get value for money than with public health.

Mr. Ferguson's remarks need to be treated with some reserve. It may well be that the number of samples taken is unnecessarily large, and that some economies can be made without reducing the efficiency of sampling coverage. But to use as an argument against sampling the fact that very few samples offend is putting the cart before the horse. Very few samples offend *because* vigilance is so strict; manufacturers know very well that if their products fail to conform to certain standards ("somewhat arbitrarily determined," says Mr. Ferguson, but this is beside the point) they run the risk of prosecution.

Does a reputable manufacturer cease checking every batch because 99 batches out of every 100 pass his quality control tests? If he relaxed his vigilance he would soon be in trouble. Mr. Ferguson's suggestions smack of the thin end of a wedge of dangerous complacency which might bring about a lowering of standards. He may think that the presence of some more water in milk than the cow intended and a little more preservative in mince or sausage than ought to be there trivial matters which should not be the concern of the public health authorities. But the people's confidence in the efficiency of our public health system is based to a great extent on the inexorable tracking down of such breaches of the regulations. It is inevitable that there is no sharp dividing line in the matter of analysis of samples between what strictly affects public health and what does not; if there were, Mr. Ferguson's remarks would have more point.

## *Get the facts right!*

"THE PRESENCE of a fat-like substance called chlorestrol in the blood causes 'furring' of the arteries and is the cause of most coronary complaints." So begins a press handout from a manufacturer of a proprietary vegetable oil. "Fats of vegetable origin," says the handout, "do not contain chlorestrol." A paper by an obscure American professor is quoted to bolster the dangers of chlorestrol and to urge the use of vegetable fats. From all this, it is deduced, there is only one conclusion, that this particular proprietary product "helps to lessen the risk of thrombosis."

Intrigued by this substance "chlorestrol" we looked it up in Heilbron and Bunbury's *Dictionary of Organic Compounds* but could find no reference to it. We assume, therefore, that what is intended is cholesterol. As an example of bogus biochemistry, medical sensationalism and sheer ignorance, this handout takes the prize. We think it is wrong for manufacturers to advertise their products with fulsome claims concocted by people ignorant of the

technical aspects. Even worse is the embellishment of these claims by citing "professors" of very doubtful credentials.

The relation between fats and heart disease was dealt with in a recent Editorial Comment (see our February, 1960, issue, p. 45) in which we rejected the contentions, actual or implied, of certain vegetable fat interests that we live under the constant threat of coronary disease. A far greater hazard among prosperous communities is the ingestion, not of the wrong kind of fats, but of too much food generally.

Radically to alter the balance of one's diet without medical advice is to court trouble. Those predisposed to coronary disease are not likely to be cured by consuming so-and-so's corn oil, neither should healthy people allow themselves to be upset by false and dishonest suggestions that consuming butter, milk, eggs and meat is bad for them.

## *Cholesterol is not a bogey*

IT IS unfortunate that the public have come to associate cholesterol with heart disease, when only a minority of the medical profession think that there may be a connection between high blood cholesterol and heart disease. We print some pertinent remarks by the U.S. Commissioner of Food and Drugs, George P. Larrick, as quoted in *Food Technology in Australia*:

"There is much public interest and speculation about the effect of various fatty foods on blood cholesterol and the relationship between blood cholesterol levels and diseases of the heart and arteries. The public has come to associate the term cholesterol with these diseases. A number of common food fats and oils, and some other forms of fatty substances, are being offered to the public as being of value in the control or reduction of blood cholesterol levels, and for the prevention or treatment of diseases of the heart or arteries.

"The rôle of cholesterol in heart and artery diseases has not been established. A causal relationship between blood cholesterol levels and these diseases has not been proved. The advisability of making extensive changes in the nature of the dietary fat intake of the people of this country has not been demonstrated.

"It is therefore the opinion of the Food and Drug Administration that any claim, direct or implied, in the labelling of fats and oils or other fatty substances offered to the public that they will prevent, mitigate or cure diseases of the heart and arteries is false or misleading, and constitutes misbranding within the meaning of the Federal Food, Drug and Cosmetics Act."

## *How to produce thrombosis*

WHILE on the subject of fats and heart disease, we saw a recent communication to *The Lancet* (September 3, p. 527) which describes some experiments to overcome the difficulty, which research has, until recently, suffered, of the lack of a suitable technique for producing thrombosis in experimental animals. Last year, two American workers succeeded in producing myocardial infarction in rats by dietary means, and by applying their technique, two British workers, Dr. G. A. Gresham and Dr. A. N. Howard, have produced in rats lesions resembling those of atherosclerosis, and have furthermore produced thrombosis without atherosclerosis.

The communication goes on: "Rats were fed two main diets. One contained 40% butter, 0·3% thiouracil, 5% cholesterol, and 2% cholic acid, while in the other the butter was replaced by 40% arachis oil. Butter contains more saturated fatty acids and less linoleic acid than arachis oil. Both groups of animals survived about a hundred days. Those fed butter died with obstructive thrombosis of the cardiac chambers, aorta, coronary arteries, and renal veins; lesions resembling atherosclerosis were not found. Those fed arachis oil developed fibroelastic thickenings of the proximal aortic and coronary-arterial intima with some lipid infiltration of the base of the lesion; thrombosis was not seen." The authors conclude that atherosclerosis and thrombosis are not necessarily related, and deduce from studies of cholesterol metabolism that plasma-cholesterol is not necessarily an index of atherosclerosis; plasma-cholesterol was much higher in the group given butter, but in contrast the cholesterol content of liver and spleen was much higher in the group given arachis oil. The authors say that their results support the view that it is undesirable to feed saturated fats to patients with coronary thrombosis, but that it is debatable whether essential fatty acids are a suitable replacement, since they may facilitate the deposition of cholesterol in atherosclerotic plaques.

Which all goes to show that the subject is much more complicated than certain interests would have us believe. That there is a connection between diet, atherosclerosis and coronary thrombosis seems undoubted, but there is a connection between diet and a lot of other things.

A man suffering from heart disease must be guided by his doctor; a healthy man has no need to worry. Food interests who say that certain fats predispose towards certain diseases are treading on dangerous ground, and we suspect they do not know what they are talking about.

Above all, more research and less wild speculation is needed.

# Fruit and Vegetable Canning by Lockwoods

One of the can filling lines.

## *Year-round operation at Long Sutton cannery*

**One of the most extensive ranges of canned fruit and vegetables in the British canning industry is produced by Lockwoods Foods, Ltd., from their factories at Long Sutton, Forfar and Carnoustie. Another factory at Fidenza in Italy produces raw materials for the British company and canned goods for the Common Market. FOOD MANUFACTURE recently visited the cannery at Long Sutton in Lincolnshire, which has a basic labour force of 800 and keeps going all the year round.**

THE beginning of the enterprise now known as Lockwoods Foods, Ltd., goes back to 1934, when the present chairman, Mr. Philip B. Lockwood, started a fruit preserving business at Long Sutton in Lincolnshire under the name of Eastern Counties Preserves, Ltd. He was later joined by Mr. J. E. Sandall, a Wisbech fruit grower, and on October 21, 1940, a new private company was incorporated and the name was changed to Eastern Counties Preserves (1940), Ltd. In September, 1959, the company's name was again changed to its present form, and in June this year became a public company with a Stock Exchange quotation.

A number of developments have taken place since the end of the war. A subsidiary factory was established at Forfar in Scotland in 1951, followed by a second at Carnoustie in 1953. In addition, two Scottish fruit farms in Angus were acquired and a subsidiary company, Lockwoods Fruit Farms, Ltd., was incorporated on December 9, 1953. Carnoustie handles mainly garden peas and Forfar mainly fruit; unlike the factory at Long Sutton, which keeps going all the year round, the Scottish factories close from about the end of January to about mid-June.

An Italian company, Lockwoods Italiana S.P.A., was established in 1958 with a factory at Fidenza. This company supplies fruit and raw materials to the parent company and also carries on an independent trade in canned goods within the European Common Market. A sales organisation, Lockwoods Sales, Ltd., was incorporated in 1953; it covers the distribution of nearly half of the company's factory output and deals with both wholesale and retail traders.

The company's products are marketed principally under the brand name *Lockwoods* and the registered trade marks *Peasant Boy* and *Lincolnshire Lad*. Present chairman and managing director is Mr. Philip B. Lockwood.

### Products

At Long Sutton are situated the principal factory and offices of the company, covering an area of 138,000 sq. ft. on a site of 10½ acres. Its location in the midst of fertile fruit and vegetable growing areas ensures that fresh supplies for canning are readily available with a minimum of transportation.

The main "fresh" vegetable pack is peas, the season for which usually lasts for about six weeks from about mid-June. For depodding the peas the factory uses 19 viners, five on the factory site and the remaining 14 on the farms. The five at the factory can be converted to broad bean podders for the bean crop.

*(Left)*: **Broad beans being fed to one of the viners.** *(Right)*: **The elevators which carry the depodded peas and beans to the automatic weighers.**

Winter vegetables such as celery, carrots and beetroot are important in enabling the factory to keep going all the year round, and imported produce are year-round staple items and include peaches and apricots from Spain, pineapple from Formosa, dried peas and Michigan pea beans, the last being processed for the company's *Beans in Tomato Sauce* pack. The tomato sauce is made from tomato purée supplied by Lockwoods Italiana S.P.A., who also provide pears and cherries for *Fruit Salad*, a popular Lockwoods product which is estimated to comprise some 10% of the canned fruit salad on the British market.

Garden peas, broad beans and stringless beans supplied to the cannery are grown under contract by independent farmers. The seed is supplied to the growers on credit, and the price of the seed is deducted from the first payment they receive for their produce. The growers are given a sowing programme, and the company's fieldsmen work in co-operation with the growers to ensure that harvesting is carried out at the correct time, when produce is in the most suitable condition for canning. In the case of peas, a tenderometer reading is taken at the factory of every load that comes in, and those which do not conform to the required standards are rejected.

Contracts for vegetables and raspberries are made on a yearly basis. In the case of strawberries, the growers are given a five-year contract, and are thus assured of a guaranteed price.

Much soft fruit is obtained from the Scottish fruit farms.

One of the latest products is *Creamed Rice*, the production of which the company has recently started.

**Labour**

The factory employs a basic labour force of about 800, which is augmented during the busy summer months by casual labour such as students and foreign girls, particularly Italians, whom the company arranges to be brought in. The company has hostel accommodation for up to 180 of these girls, and considerable publicity is arranged in Italy to secure for the company all the labour it requires from this source.

**Water supply**

One of the biggest problems in any cannery is the supply of fresh water, and the problem is further complicated in the case of the Long Sutton factory by the fact that there are no public sewers for the disposal of effluent. After settling in tanks, the effluent is discharged directly to the nearby River Nene. Water is obtained from the East Elloe Rural District Council, and three 75,000 gallon storage tanks enable the factory to carry on undisturbed during fluctuations in the local supply.

**Production**

During our visit, canning of broad beans was the principal occupation. The five viners had been converted from pea production by altering the size of the slatted screens inside. Whereas in the case of peas, the peas are vined on the farms and the threshed peas are delivered to the factory in boxes, in the case of beans all the vining is done on the factory site because a larger number of small growers supply the beans and it would be impossible to vine them economically on the farms.

Output of each viner is 200 42-lb. bags per hour, and from each bag are obtained 12 lb. of beans.

Peas and beans follow the usual canning process. Beans from the viners, and peas from the delivery hoppers into which they have been discharged, are transferred to six elevators, the peas by gravity and the beans by hand. They then go to cleaning machines which consist of vibratory screens

(*Left*): **Preparing fruit for "Fruit Salad."** (*Right*): **Cutting apricot slices for canning.**

which shake out the dirt, and then to automatic weighers which weigh 1 cwt. lots at a time.

At this point it may be mentioned that in the case of peas, growers are paid on the first clean weight and on a scale according to their tenderness as measured by the tenderometer. In the case of beans, the growers are paid by the bag.

From the weighing scales, the vegetables are flumed in a stream of water to the main factory building, the process being assisted by means of two pea pumps. Between the pea pumps and the dewaterers to which the vegetables are pumped, the water is recirculated continuously in a closed circuit, and is therefore chlorinated to 4½ p.p.m. It is vitally important in sound canning practice that the vegetables at this point be thoroughly washed with fresh water.

The dewaterers, of which there are four, consist of rotating cylindrical drums through which the peas are passed and separated from the water which brings them from the cleaning machines. The vegetables are then passed to four flotation washers, where they are separated from unwanted matter, such as pods, etc., by the fact that the vegetables sink, whereas the rubbish floats. Another advantage of the flotation washers is that the material is given a further wash. The peas or beans are then conveyed by water into rotating drums, and given a further wash from which they fall into a hopper and are conveyed by elevator to a washer-grader. In the case of garden peas, this serves the purpose of removing the very small peas, which are canned as *Petits Pois*.

Peas are pumped into 16 holding tanks which are also used as soaking tanks for the Michigan pea beans used for *Beans in Tomato Sauce*; these are given a soak lasting 18 to 24 hours.

Broad beans by-pass the holding tanks and are taken directly to the inspection belts where women remove pieces of pod which may have slipped through to this point. Beans are notoriously difficult to free from pod material, which is liable to be carried through to this stage.

From here, peas or beans go to the three blanchers which wash, sterilise, give a preliminary cooking and remove excess starch. From the blanchers they go to rotating drums for final washing and cooling, and then along another series of five inspection belts where substandard and discoloured produce is removed by hand.

**This worker is examining plums as they pass on a moving belt.**

**Canning**

There are two Mather and Platt fillers working at 250 c.p.m., and two Robert Kellie fillers working at 180 c.p.m. Each filler feeds a Metal Box CR seamer.

The covering liquid for the filling machines is made in stainless

**Two of the production lines where " Fruit Salad " is filled into cans, an operation which of necessity is done by hand. The various kinds of fruit are filled in a specified order to the correct weight, and are then placed on a can conveyor to be taken to the sealing machines. These Italian girls are brought over from Italy by Lockwoods to overcome the local labour shortage.**

steel pans in separate tanks on the first floor of the factory, and is fed to the filling machines by gravity. It consists of 2% brine solution with added vegetable colour, except in the case of peas, when sugar and mint essence are added to the covering liquid in addition. *Beans in Tomato Sauce* are filled in the same way, the covering liquid being tomato sauce.

The filling machines are interchangeable to cover sizes of can ranging from 5 oz. to A.2½. The sealed cans are sterilised in 40 pressure retorts, each of which holds three cages. Sterilisation temperature is 240-250°F., and sterilisation time varies from 20 mins. for fresh vegetables to 2½ hrs. for processed peas.

**Creamed rice**

The sterilised cans, after cooling, are cased up by hand and allowed to remain in store for one week in an unlabelled state. This allows any faulty cans to be spotted: spoilage rate, we were told, is exceptionally low. The cans are coded by the closing machine so that if any spoilage does develop the processing of the particular can concerned can be traced back.

After storage on pallets, the cans are labelled on three Beth labelling machines which operate at 200 to 400 c.p.m.

At present there are two retorts devoted to the sterilisation of filled cream rice cans.

These are mounted on trunnions in a pit, and are continuously rotated during the sterilisation time to prevent settling and consequent local overheating of the can contents. The present output of *Creamed Rice* is about 70 cases per day, but it is planned to double this output in the near future by installing two more retorts, for which there is space provided in the pit.

**Fruit salad**

*Fruit Salad* is made in a section separate from the main cannery, and involves mainly hand work. There are three production lines. The basic operations involved in fruit salad production are opening cans of imported fruit, sorting, grading, peeling, washing and packing into cans which are then sealed and sterilised. The women work on either side of tables, down the centre of which runs the can conveyor. The sorted fruit is weighed by hand and placed in definite order into the cans, which are then put on the conveyor and transferred to the sealing machines.

The emphasis is on a balanced pack containing a specific number and variety of fruit.

These three production lines can be used during the season for supplementing output of the soft fruit lines.

**Fruit lines**

There are six fruit lines which deal with various kinds of fruit—plums, strawberries, soft fruit, apples, pears, etc., when they are in season. The basic system common to all is inspection on an inspection table, followed by washing by water spray, grading according to size, and canning. The lines are used for any fruit and vegetable which cannot be dealt with automatically, and manual work is mainly used in all operations up to the canning stage.

The filling tables have a double can track with a filling tray, the cans passing underneath the tray. Empty cans go along one of the tracks to the tray, which has meanwhile been loaded with fruit. The fruit is swept off the tray into the cans, and when these are full they are weighed and transferred to the other track, which takes them to a straight-line syruper where they are filled with syrup by means of a sparge pipe. The surplus syrup overflows, and is collected in a sump underneath and pumped back to the header tank.

The filled cans then go to a clinching machine which loosely fits the can ends, then to an exhaust box where they are

(*Left*): **Cans being filled with plums by means of a filling tray. The tray has a slot under which the cans pass; as they do so the fruit is guided through the slot.** (*Right*): **Cans being topped up with syrup by means of a sparge pipe fed from a header tank. The overflow is collected and returned to the header tank.**

heated to a temperature between 190 and 212°F. This temperature is essential to ensure that the sealed can has a good vacuum inside. From the exhaust box the cans go to a double sealing machine and then either to a rotary cooker and cooler or to retorts where they are heated at 212°F. for 5 to 20 mins. according to the type of fruit.

### Can supply

Cans are supplied by the Metal Box Company by road, mainly from their Wisbech factory. Much of the can delivery is by the cage system in which wire cages holding between 1,800 and 4,500 cans, depending on the size, are delivered on special trailers holding 24 cages. The cages are unloaded by pallet trucks. Empty can feed is by two friction elevators and assisted power track. By means of a wooden fork with which she transfers two rows at a time, one girl can maintain a constant supply of cans at the rate of 250 c.p.m. Cans are stored in a new can store which has recently been constructed and can hold one million cans.

**This retort mounted on trunnions is used for sterilising "Creamed Rice"; rotation of the retort provides constant agitation.**

### Health drinks

There is a small production line for the manufacture of health drinks, of which the company manufactures three kinds—raspberry, orange and pineapple.

The drinks are prepared in two 100-gallon stainless steel pans, pasteurised, and filled into bottles by means of a rotary filling machine at a rate of 40 bottles per min. The bottles are capped on a Metal Closures capping machine and labelled by means of a Purdy *Junior* labeller. There is a bottle-washing machine for washing bottles before filling.

### New product

A new product which the company is about to market is *Risotto*, which consists of rice, bacon, tomato purée, spices and other ingredients.

There is a well-equipped workshop which has facilities for carrying out maintenance work on every machine, except for major overhauls. Some of the machines, such as washers, are of the company's own design and manufacture; other machines we saw which have been made in the workshops included a peach slicing machine and a rhubarb cutting machine.

Steam for the factory is supplied by two Lancashire type automatic oil-fired boilers.

Quality control is undertaken by the laboratory, which also carries out experimental work.

### Some Suppliers of Equipment

Albro Fillers and Engineering Co., Ltd.: filling machine.
A.P.V. Co., Ltd.: boiling pans.
W. and T. Avery, Ltd.: weighing machines.
Beth Label and Wrapper Machines, Ltd.: labelling machines.
Wm. Brierley, Collier and Hartley, Ltd.: automatic peeling machines, rotary snibber.
A. Dodman and Co., Ltd.: viners, retorts.
International Machinery Corporation: tenderometers.
Robert Kellie and Son, Ltd.: can filling machines.
Lansing Bagnall, Ltd.: trucks.
Mather and Platt, Ltd.: viners, cookers and coolers, filling machines.
Metal Box Co., Ltd.: can closing machines, can elevators and conveyors.
Metal Closures, Ltd.: capping machines.
Miller Hydro Co., Ltd.: bottle washing machine.
Fred Myers (Industrial), Ltd.: *Hyster* trucks.
S. Parsons and Co., Ltd.: retorts.
Purdy Machinery Co., Ltd.: labelling machine.
Sigmund Pumps, Ltd.: pumps.

# Stainless Steels

By Eric N. Simons

**Considerable confusion still exists regarding the stainless, or properly speaking the corrosion-resistant, steels. The term covers a wide range of compositions, properties and applications, and with the increasing use of these steels in the manufacture of food machinery and equipment, the food manufacturer needs guidance if the equipment he buys is to conform entirely to his basic requirements. This article outlines the main types of stainless steel and the uses for which they are intended.**

THE corrosion-resistant steels are divisible into four principal categories:

(1) the "straight" or "plain" chromium steels;
(2) the misnamed chromium "irons";
(3) the austenitic chromium-nickel steels; and
(4) the heat-resisting steels and alloys.

## 1. PLAIN CHROMIUM STEELS

The composition of these usually lies within the following range: 12-14% chromium, 0·3-0·35% carbon; 0·2-0·4% silicon, and 0·2-0·4% manganese.

They are sometimes termed the "martensitic" stainless steels to differentiate them from the "austenitic" chromium nickel stainless steels, the name being derived from their characteristic microstructural condition.

The silicon content is in no ways exceptional. These steels are the original stainless steels, first used for cutlery. They are fully stainless, and have a considerable degree of resistance to oxidation when heated to high temperatures, this resistance being much greater than that of ordinary carbon steel. When subjected to prolonged heating at temperatures up to 700°C., and even higher, there is little oxidation of the surface. Temperatures in the region of 750°C. and upwards, however, produce a scale which has to be eliminated by grinding, machining or pickling to ensure that the stainless properties of the material are fully developed.

The steel has a fine grain structure, and it can be heat-treated to make it either softer or harder. Whenever an exceptionally hard steel of this type is required, a higher carbon content will give precisely the degree of hardness desired. It should be noted that if heated to temperatures not exceeding 500°C., this steel will show no loss of hardness.

Most ordinary steels are supplied in the softened or annealed condition to simplify their machining, but when this steel is annealed, the hard carbide particles of its structure coalesce, while the structure itself is not uniform. Consequently, it is better to have the steel in a hardened and tempered condition for machining.

### Mechanical properties

The mechanical properties of the steel vary according to the tempering temperature, but the ultimate tensile stress is usually between 35 and 45 tons/sq. in., with elongation 25% in 2 in. The tempering temperature should not exceed 450 to 600°C., as this lowers the resistance to corrosion. The steel is liable to a type of corrosion known as "line-decay," when pieces of it in different physical conditions, such as hardness, are in firm contact under corrosive conditions. One piece then becomes anodic to the other, and this may produce severe attack.

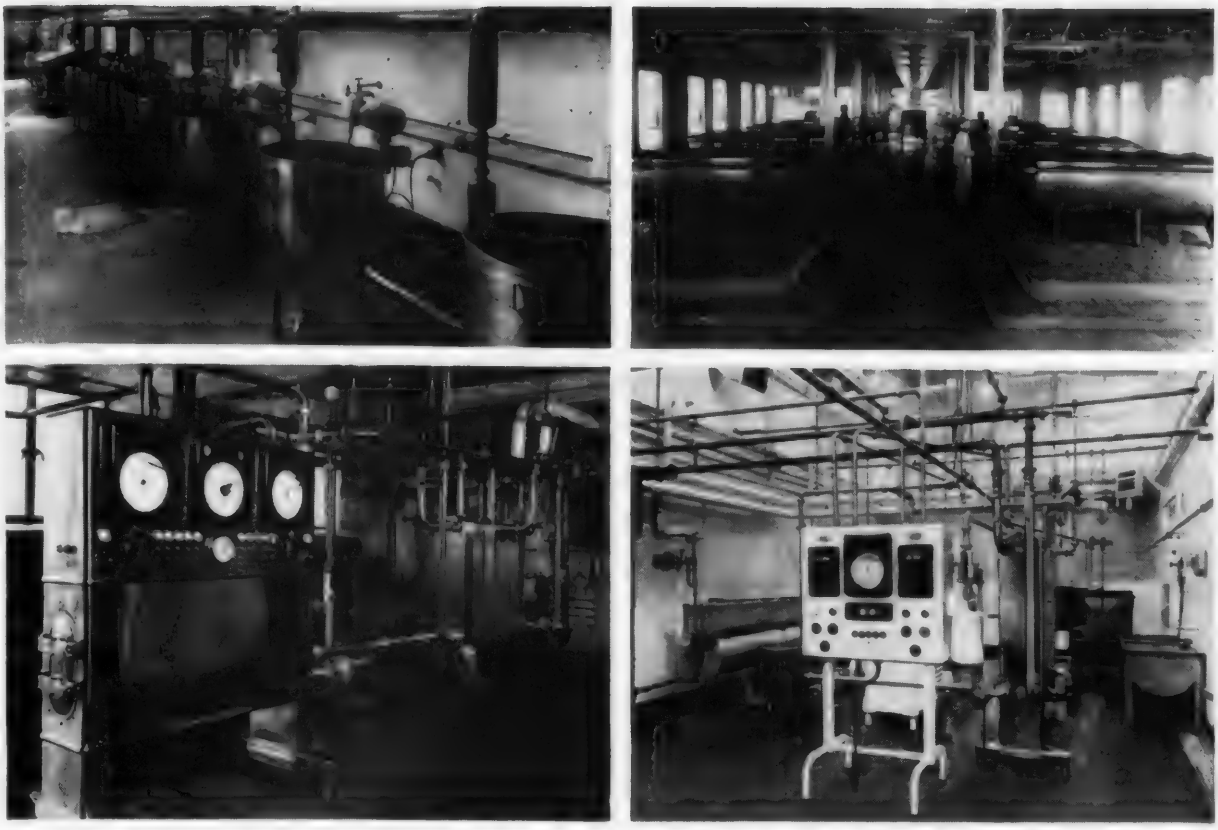
The plain chromium corrosion-resisting steels have coefficients of thermal expansion of 0.000011 ° C. at temperatures up to 200°C., and 0·0000115/°C. at temperatures up to 400°C. Ordinary mild steel has a corresponding thermal coefficient of 0·0000125, copper of 0·0000172, and brass of 0·0000187/°C. up to about 200°C.

The significance of these figures is that chromium stainless steel expands rather less when heated than mild steel, copper or brass, and this is useful when parts for high temperature service are required, and expansion has to be minimised.

### Heat transmission

Chromium steels are about six times as electrically resistant as pure iron, and about seven times as resistant as copper. The specific gravity of the steels is much the same as that of mild steel.

Important is the fact that chromium steels have a higher heat conductivity than pure iron, and are therefore advantageous for parts or functions involving the rapid absorption and transmission of heat. Fully tempered to a tensile strength of 50 tons/sq. in., the steel has a thermal conductivity of about 0·045 c.g.s. units. When hardened, the conductivity is about 0·035 units, as compared to 0·145 for pure iron. Summing up, this means that only a third or a quarter of the energy required to raise the temperature of a chromium steel is



**Two kinds of stainless steel which are widely used in the food industry are FMB [18 8 3 Mo] and FDP [18 8 Ti-Firth Vickers nomenclature]. The former is a molybdenum-containing steel and is resistant to the corrosive materials commonly encountered in the industry, such as $SO_2$ and salt. Examples of plant made of this material are the steam-jacketted pans and sieving machine in the C.W.S. works at Lowestoft (*top, left*), the milk ripening vats in the Stork margarine works at Purfleet (*top, right*), and the blackcurrant juice pasteurisation plant at Carter's plant at Coleford (*bottom, left*). FDP is used where hygiene is the prime factor and there are no severe corrosive conditions, as in the liquid egg pasteurisation plant of John Rannoch, Ltd., at Haughley Park (*bottom, right*).** ***(Courtesy the A.P.V. Co., Ltd.)***

needed as compared to a carbon steel with the same carbon content.

These are the general properties of the group, but some of the individual steels of the group deserve particular mention. One of these corresponds in composition to B.S.S. S.62. It contains 0·15-0·35% carbon, 0·5% silicon (max.), 1·0% nickel (max.), and a minimum of 12% chromium. Unlike the steel outlined in the previous paragraphs, it is used in the hardened and *fully tempered* state, and has the following mechanical properties: ultimate tensile stress, 46 to 52 tons/sq. in.; elongation, 20% min. in 2 in.; reduction of area, 45% min.; Izod impact value, 35 ft. lb. (min.) for specimens up to and including 2 in. dia.; Brinell hardness, 207-235.

## 2. THE STAINLESS "IRONS"

The stainless "irons" are now more often known by the name of low carbon stainless steels. They were developed to provide stainless or corrosion-resisting steels with a greater malleability and ductility than the martensitic type possessed. To achieve this, the carbon content was reduced, and it was found that this did not greatly affect resistance to corrosion, and on occasion the corrosion resistance was improved.

A characteristic stainless "iron" has the following composition: 0·15% (max.) carbon, 12-14% chromium, 0·2-0·4% silicon and 0·2-0·4% manganese. If this steel has a low enough carbon content, it can be hardened by cold work only, and does not respond to a hardening heat-treatment.

The essential difference between these steels and those of group 1 is that they have a lower carbon content. They are employed for those parts that do not require a specially hard steel, and where pressings have to be made without cracking and with greater ease than is possible with the group 1 steels.

The steels will withstand oxidation if heated to temperatures up to 700°C. for prolonged periods of time, and only slightly oxidise at even higher temperatures. They will give varying mechanical properties when heat treated and tempered, but a quenching and tempering between 450 and 600°C. greatly lowers their resistance to corrosion. In all other respects, their properties are analogous to those of the steels of group 1.

These "irons" are, however, not suitable for those purposes which, while not requiring a hard steel, do need a somewhat higher degree of strength than the "irons" will give. This led to the development of a heat-treatable quality giving mechanical properties half way between those of the hard chromium and those of the low carbon stainless steels. This has a composition broadly as follows: 0·15-0·3% carbon, 12-14% chromium, 0·2-0·4% silicon, and 0·2-0·4% manganese. The difference lies in the wider range of carbon content. This steel may be regarded as midway between the steels of groups 1 and 2.

**The 16/2 stainless steel**

Before we turn to the austenitic steels of group 3, we must mention a well-known steel which is covered by B.S.S. S.80. It has a higher chromium content than the steels so far described, and also has a nickel content. The typical composition is: 16-20% chromium, 1·5% nickel, 1·0% (max.) manganese, 0·5% (max.) silicon, and 0·15-0·25% carbon. It is in effect a martensitic steel, which means that it can be modified in properties by the normal hardening and tempering processes. The true ferritic stainless steels have a carbon content of less than 0·12%.

The steel, when suitably heat-treated, has a tensile strength of 55 tons/sq. in. minimum; yield strength about 80% of the tensile strength; elongation 15% min.; Izod impact resistance 25 ft. lb. min.

These two steels are used wherever a corrosion-resisting steel is required with comparatively high tensile strength. The Brinell hardness number depends on the size of the piece, and is probably below 475 for sections of more than $1\frac{1}{8}$ in.

## 3. AUSTENITIC STAINLESS STEELS

We now come to the most important of the four groups, the austenitic chromium nickel stainless steels. There are so many different compositions of these, especially if those of American origin are included, that for the purposes of this article it is essential to describe only the more important and popular steels of this group. The steels here described have a similar basic composition, but slight modifications have been introduced to develop specific properties.

**Characteristic feature**

The characteristic feature of this group is that the steels contain chromium and nickel in proportions that usually produce a type of microstructural condition known as austenite, hence the name austenitic.

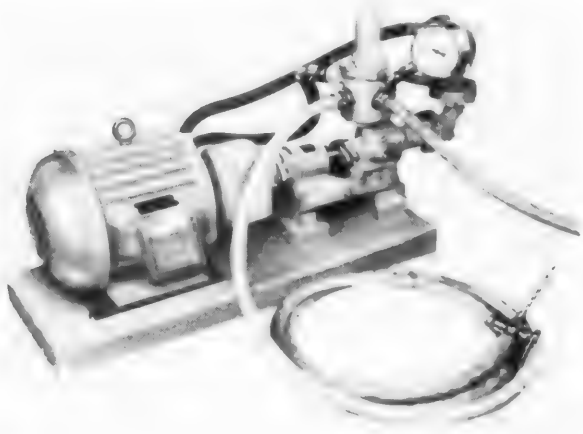
The first steel of this group is an alloy of iron with a comparatively high chromium and nickel content. A characteristic composition is 0·15% carbon (max), 18-20% chromium, 8-9% nickel, 0·4-0·8% manganese, and 0·5% (min.) silicon. This steel is non-magnetic, and has a much higher resistance to corrosion than the steels of groups 1 and 2.

When fully softened, a steel of this type will have the following mechanical properties: 40 tons/sq. in. ultimate tensile strength; 15·5 tons/sq. in. yield strength; elongation in 2 in., 68·5%; reduction of area, 71·5%; Izod impact, 105 ft. lb.; Brinell hardness, 149.

For most ordinary purposes, steels of this particular composition are effective; but whenever a part has to be welded, there is a risk of a form of corrosion known as "weld-decay" or intergranular corrosion. The immediate region of the steel where the weld metal is deposited is actually liquefied. The heat generated in this zone is so intense and the steel is so thermally conductive that the heat travels beyond the welding zone on both sides. There is thus a region—approximately $\frac{1}{2}$ to $\frac{3}{4}$ in. on each side of the weld—which has been elevated to a temperature of the order of 450 to 900°C. This is a "critical" temperature, which means that the microstructure is strongly modified, and these modifications make the steel susceptible to corrosive attack. To prevent this, it is now the practice to introduce what are termed "stabilizing" elements into the composition, which eliminate corrosive attack from this cause and also increase the resistance to other forms of corrosion.

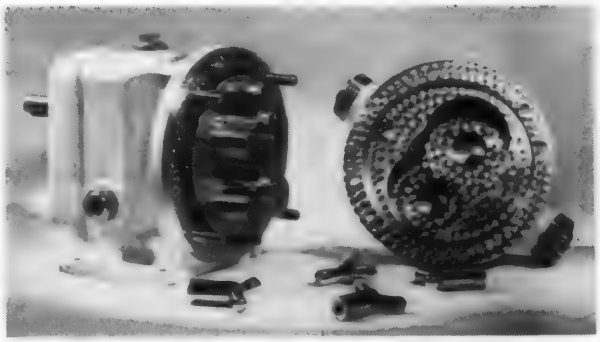
It should be noted, however, that these stabilising elements reduce the ductility and toughness of the steel to some extent, so that stabilised austenitic stainless steels should only be used when the design or size of the weld assembly make it impracticable to remove the weakened zones by a form of heat-treatment. The principal stabilising elements added are tungsten, titanium or columbium (sometimes known as niobium). The extent of the addition is from 0·5 to 0·8%.

In many instances the welded assembly can be heated in a furnace to a temperature of 1,150-



**This Mono brine injection unit, comprising pump and needle for injecting brine into the veins of a carcase, is made in 18 8 stainless steel.**
*(Courtesy Mono Pumps, Ltd.)*

1,200°C., which relieves the strains set up by welding, and restores the affected zones to their proper strong structural condition. Sometimes quite strong corrosive agencies can be resisted without either stabilisation or heat-treatment, and with no reduction in properties, so that there is no necessity to assume that the standard composition will never serve.



**An all stainless steel pump, the R.E.C. positive rotary pump, especially suitable for sticky and viscous liquids.**

*(By courtesy of Stainless Steel Pumps, Ltd.)*

**Resisting sulphuric acid**

We need not dwell unduly on a quality specifically intended to withstand the attack of sulphuric acid. This contains from 3 to 4% of molybdenum, and so increases its resistance to the acid by as much as 20%, even when the acid is of the concentration of 80% and over. Molybdenum is also advantageous in helping the steel to withstand weld-decay.

**Deep stampings**

Another type of austenitic stainless steel is particularly designed for making parts or objects that have to be deeply stamped. It is the most ductile and softest of the austenitic steels, and a typical range of composition is: chromium, 12-13%; nickel, 12-13%; carbon, 0·15% (max.); silicon, 0·5% (min.); manganese, 0·4-0·8%. It will be seen that this steel contains less chromium and higher nickel. Deep pressing and stamping operations or other processes requiring severe deformation of the steel in the cold state make the use of this type compulsory, and the resistance to corrosion is adequate in varying circumstances.

The mechanical properties of the materials included in the group 3 classification are much the same for all the qualities, and are: tensile strength 40 tons/sq. in.; elongation about 50% in 2 in.; impact 90 ft. lb.

**Other qualities**

There are still other qualities in this group which must be mentioned. One is for making welded articles requiring a bright polish. Another contains 1·75% molybdenum, and is designed to improve the acid-resisting properties of the standard austenitic stainless steel. It is used when higher corrosion resistance is required than the normal qualities will provide. There is also a general purpose acid-resisting steel suitable for use in conditions of severe chemical attack, such as from phosphoric acid, but it has not so great a resistance as the quality designed for sulphuric acid. A steel of similar corrosion-resistance to the general purpose corrosion-resisting steel has a high resistance to scaling combined with good mechanical properties at elevated temperatures. As it incorporates a small columbium content, it can be welded and resists weld decay.

Austenitic stainless steels have a higher coefficient of thermal expansion than mild steels, so that if they are required in the form of castings, the contraction allowance for pattern-making must be about 50% greater. Castings are not usually made of more than 3 tons weight, but heavier castings can be obtained.

The amazing variety of the stainless steels is exemplified by the development of a range in which the predominant factor is resistance to heat, while not being technically heat-resisting steels proper. Such a steel, for example, is the 27% chromium, 12% nickel steel.

## 4. HEAT-RESISTING STEELS

When it is desired to resist temperatures higher than 900 deg., it is usually necessary to use a steel of the group 4 type. These, like the austenitic stainless steels, are of numerous compositions, but they are little used in the food industry proper, though power plant, ovens, etc., may embody parts made from them. In these circumstances we need merely indicate that this group contains usually more chromium and less nickel than the specifically stainless steels. They are mostly used in the form of castings, and their mechanical properties depend entirely on the composition.

## FOOD INDUSTRY APPLICATIONS

Hot vinegar will attack a straight chromium steel of the group 1 type, but a 17-20% chromium, 2-3% nickel steel is immune from attack of this kind. Thus, sauces and pickles will then not be discoloured by iron, as they might be if the cutlery type of stainless steel were used.

The 18% chromium, 8% nickel stainless steels have many applications in the manufacture of food and dairy products, and in such work, where the welds are ground and buffed to a high polish, the occurrence of spots is most injurious, as it may cause local rusting. For these reasons, it is essential to ensure that the steel is perfectly clean before it is welded.

**Steels containing copper**

We have not hitherto mentioned a quality of stainless steel containing 20% chromium, 0·3% carbon, and 1% copper. This is because few of the copper-containing stainless steels have justified themselves in service. This particular quality, however, is virtually immune to all foodstuffs and most organic chemicals, in

the handling of which the Americans have used it extensively. Though the writer has no direct experience of them, the chromium - silicon - copper stainless steels are claimed to be quite suitable for application in the food industries, where ordinary atmospheric and salt water corrosion is encountered, supplemented by the corrosive effects of the cleaners employed.

The 27% chromium, 12% nickel steel has good resistance to organic acids, such as acetic, citric, lactic, etc. An alloy with 80% nickel has also been developed specifically to withstand corrosion and tarnish by the acids and other compounds found in foodstuffs.

18% chromium, 8% nickel stainless steels are ideal for the different equipment, pipe lines and utensils used in breweries. It is possible to make these lighter without sacrifice of strength, while the freedom from corrosion retains the thickness of the steel for many years of active use. The steels are insoluble in water, wort and beer. There is no harmful effect on appearance, flavour or colour, and the metal can be highly polished to whatever degree is desired. Good welded joints can be made, made smooth by grinding, and polished. The steels have been used for making tanks and vats used in breweries, e.g. fermenters, storage vats, pressure casks, yeast vats and pure culture apparatus. Pipe lines and surface coolers, barrels, and even brewing kettles, have also been made.

In recent years the demand for purity in foods has led to the design and manufacture of all classes of machines incorporating stainless steels in their construction. Makers of filling machines are using them for parts coming into contact with foods. Stainless steel feed worms, for example, are made in varying sizes, being readily machined from solid, centreless-ground, stainless steel bars. In a machine for filling glass jars with meat-paste, the feed hopper is of cast austenitic stainless steel, and has a sand-blasted finish designed to give a clean and reasonably smooth interior to ensure easy cleaning.

Tanks, 6 ft. long by 3 ft. deep by 3 ft. wide, of welding quality austenitic stainless steel, are being used in jam manufacture. The tanks are welded in 18-gauge material, polished on one side and descaled on the other. All internal welds are ground off smoothly on the inside of the tank, and polished to the same degree as the sheet, so that it is impossible to detect the welds from the inside. These tanks sit in a frame of low carbon steel, and the stainless steel sheet is brought over the top angle of this frame to prevent all contamination. All the corners of the tanks are radiused to make cleaning easy. The bottoms of the tanks slope towards the centre, where a stainless steel pad is welded on to take the ring-off pipe.

In a steam-jacketed vessel for drying blood, corrosion of the agitator plates was considerable, pitting taking place after a short period. Pitting also occurred on the arms of the agitators, particularly at the angle close to the agitator plates. The shell of the vessel was mostly attacked where it was joined by bolts to the outer steam shell. The plates had to be replaced every three years, and the arms after five years. By installing austenitic 18-8 stainless steel beater plates, the maker found that at the end of five years no attack had taken place.

A considerable quantity of equipment for acetic acid is being made from stainless steels, such as stills, base heaters, holding tanks, heat exchangers, pipelines, valves and pumps, under conditions ranging from dilute solutions below 50% at room temperature to concentrated solutions, up to 99%, at 130°C. Fractionating equipment, storage vessels, pumps and process piping, are used for handling glacial acetic acid, and here, too, various qualities of stainless steel have proved ideal. Molybdenum-containing austenitic stainless steels are of great value when the acetic acid is mixed or contaminated with other acids.

In the handling of fatty acids of higher molecular weight, the molybdenum-containing stainless steels and the newer precipitation-hardening stainless steels are being employed for pump and valve parts where galling is to be avoided and hardness is required.

For handling lactic acid the molybdenum stainless steels are more resistant to corrosion than the other qualities, but stainless steel is not suitable for use with lactic acid at temperatures above 90°C. The only use here for stainless steel is for vessels for storing pure solutions at temperatures below 40°C. if the concentration of lactic acid is from 30 to 70%, or if chlorides or inorganic impurities are present.

Stainless steel in the food industry is also of great value when the equipment is subjected to water spray, continuously flowing water or severe cleaning processes, which may cause rusting. For this reason the modern food manufacturer employs it in bottle washing plant, continuous coolers, continuous cookers and conveyors for containers.

In handling sauces or pickle liquors, other uses for stainless steel include exhaust hoods over open kettles and tanks, impellers for handling the fumes from these tanks, agitators, drums to hold dry ingredients, and filler bowls.

It would be impossible in the space at disposal to specify the particular type and composition of stainless steel suitable for every one of these numerous applications, particularly because the conditions vary considerably from plant to plant. An acid concentration at one plant may differ from that at another, so that a general recommendation would mislead. It is always better to consult the manufacturer of the particular equipment concerned, and if he is in doubt, the makers of stainless steel have a tremendous fund of experience and knowledge accumulated over the years and designed for guidance, which can be drawn upon as required.

*How to cut corrosion costs*

# The Corrosion and Metal Finishing Exhibition

**Corrosion costs British industry about £600 million a year. At Olympia, London, from November 29 to December 2 more than ninety firms and Government organisations specialising in the means of cutting this wastage are exhibiting their products and techniques. Many of these are of great interest to the food manufacturer, and this special survey selects those exhibitors whose services can be of great value in the food processing industry.**

THE applications of corrosion preventing techniques can be grouped according to whether they are meant to counter the ravages of natural processes or those initiated by man. Under the former heading come the effects of weather and damp on structures, factory buildings, etc., and under the latter come the effects of corrosive process materials on plant, pipelines, storage tanks, etc.

This survey is therefore divided into two broad sections; the first lists those firms who specialise in the proofing of structures and structural materials; and the second lists those who are more concerned with plant. Inevitably, the dividing line is not sharp and many examples overlap. For obvious reasons of hygiene and avoidance of contamination, higher standards of corrosion resistance are demanded of materials which come into direct contact with food than is the case in many other industries, even though the materials used in food processing are not in general as corrosive as those often used in the chemical industry.

## FACTORY STRUCTURES

Three materials supplied by **C. and P. Development Co., Ltd.**, for the treatment of metal surfaces are *Rust-Anode, Capalla* and *Skaline*. *Rust-Anode* is a metal coat which can be applied to steel surfaces by brushing, spraying or dipping. It leaves a coat of pure zinc which is strongly adherent, ageproof and rustproof. The degree of protection increases with the pure zinc contents of the coating, and it is claimed that this material gives as much as 95% of pure zinc in the dried film. The process is referred to as "cold galvanising," since it gives an equivalent type of coating.

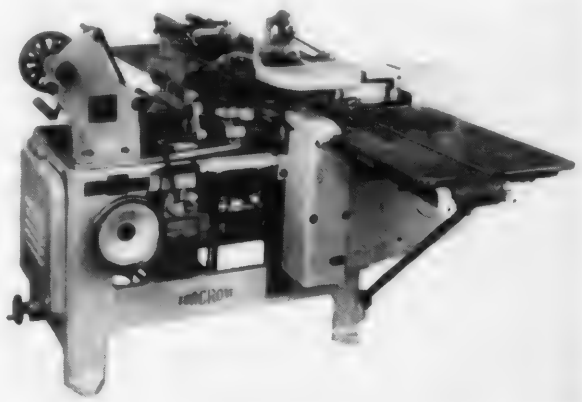
*Capalla* is a chemical cleaner for preparing metal surfaces before painting. It completely removes rust, atmospheric contaminants (many of which are invisible), alkali and acid residues, corrosion agents in handmarks and other causes of paint blistering.

### Mill scale remover

*Skaline* is a mill scale remover, the purpose of which is to prepare surfaces before the application of protective coatings. It makes a most useful pre-treatment of metal before applying *Rust-Anode*, especially where mill scale is prevalent and when sand blasting is impracticable or impossible on standing structure and equipment.

A new special-purpose coating which can be applied to most constructional materials, such as plaster, plasterboard, cement, bricks, wood, hardboard and asbestos board, is *Polytile* plastic glaze made by **Corrosion, Ltd.** It is especially suitable where hygienic requirements are stringent or where a high degree of resistance to humidity, chemicals, solvents, fats and greases is necessary. It can be applied by brushing or spraying, without any special skill, and dries to a smooth coating with almost tile-hardness and with a high gloss. It has good heat resistance (up to 400°F.), good resistance to hot and cold water, water vapour, chemicals, solvents, etc., and can be cleaned with detergents and disinfectants. It is available as a clear glaze and in a variety of colours.

The range of *Corro-Proof* chemical resistant cements, jointing compounds and coatings is being shown by **Corrosion Technical Services, Ltd.** The latest additions to the range are epoxy-resin and chemical resistant polyester-resin cements. Examples of both epoxy-resin and poly-



**This chocolate foiling and banding machine is treated with Evocote type 21 metal primer, one application of Evokote stopper and two coats of Evokote type 21 finish.**

ester-resin/glass laminated fabrications are also being shown.

The company is a member of the Mowlem Group and its stand is adjacent to that of its associate company, **Soil Mechanics, Ltd.,** with whom it offers an extensive corrosion engineering service, including cathodic protection as well as acid resisting tiling and construction and plant and structure protection.

**Anti-corrosion paints**

On their stand, **Drynamels, Ltd.,** illustrate the service they provide as paint manufacturers and corrosion specialists, stress being laid on their advisory service. Their exhibits fall into three main categories; the first deals with the maintenance of buildings and plant, and typical proven paint systems are displayed, including types resistant to heat, chemical attack, and extreme weathering conditions; the second is concerned with the variety of stoving primers, enamels and finishes of various kinds offered by the company; and the third illustrates certain specialised coatings and other new materials now under development, with particular attention to the protection of plant against corrosion in extremely severe operating conditions.

**Evode, Ltd.,** specialise in the manufacture of chemical and corrosion resistant paints. The food industry is one of the main outlets for the *Evokote* range of *Epikote* resin based paints, of which types 10, 20 and 21 are among the most widely used.

Type 10 is a one part Epikote resin based paint suitable for general maintenance painting of machinery, and combines simplicity of application with rapid drying and good resistance to steam, heat, mild fatty acids, detergents and abrasion. Type 20 is a two part paint with outstanding hardness and abrasion resistance. It is supplied either as a clear lacquer or as pigmented coatings; the former is suitable for wooden floors, laboratory benches, etc. Type 21 is also a two part composition with great resistance to water, steam, dilute fatty acids, etc. It has found particular application on bottle washing and filling machinery, chocolate mixers, wrapping equipment, conveyors, etc.

The latest addition to the *Evokote* range of products for the food industry is the *Evokote* floor screed. This material is supplied in two grades known as G.P. grade and C.R. grade. Both types consist of an *Epikote* resin based medium into which is mixed selected aggregates and colours to produce a material which can be applied by trowel to any sound surface, and which will give an attractive and jointless floor. They have excellent resistance to water, acids, alkalis, fats, grease, oils, point loading and abrasion.

This new flooring is jointless and its performance is comparable with tiling. Whilst this material is obviously considerably more expensive than concrete or asphalt, the disadvantages of the latter materials with respect to their acid and fat resistance is completely eliminated, and the finished floor surface is claimed to be generally less expensive than tiling. Examples of these floors will be shown on the stand.

**Ventilator**

A roof ventilator made of glass fibre reinforced plastic, which will not be corroded by polluted factory air, is among the extensive range of equipment made from reinforced plastics shown by **A. E. Griffiths (Smethwick), Ltd.** The basic material used in the body and cowling of the ventilator resists attack from most industrial processes and even from oxidising acids when diluted by the normal workshop atmosphere. The impellor is made of steel but is homogeneously coated with polythene, and the only other metal part is the electric motor. The units are carefully styled to blend with conventional buildings but are particularly suited to the bold outlines of modern structures. The design suits any pitch of roof together with horizontal or vertical mounting. A special feature giving ease of maintenance is the hinged cowl which readily exposes the motor for servicing, and an enclosed cable duct protects electrical work.

The main features of the exhibits of **Hangers Paints, Ltd.,** will be centred round the protection of steel and concrete, using the firm's epoxide paint systems as well as other specialised and conventional coatings. The firm have succeeded in producing an epoxide system with remarkable adhesion to metal and between coats, even after prolonged immersion in water.

**Metal treatment**

The **Walterisation Co., Ltd.,** will be showing typical applications of their metal surface treatments for the corrosion protection requirements of industry. In addition to their phosphate rust-proofing processes, the new decorative and protective treatments for aluminium will be on display. These will be based on *Walterbryte* to give a pleasing satin finish, and *Cromcote*, a chromate conversion treatment having a high degree of corrosion protection and excellent paint-bonding properties. Among typical applications for these treatments will be aluminium window frames, which have been electrolytically anodised after *Walterbryte*.

Other industrial products illustrating the use of phosphate coatings for rust-proofing, paint-bonding and specialised production operations, such as deep drawing and cold extrusion will be on show. Samples treated in *Waltergel*, a de-scaling jelly, and *Foscote R.S.*, a brush-on rust removing solution, will also be on view.

Examples of various iron and steel components rust-proofed by the *Sherardising* process, and also components protected against heat oxidation, corrosion and wear by *Arkrom* chromium diffusion will be shown by **Zinc Alloy Rust-Proofing Co., Ltd.** The company do not manufacture these components, but specialise in carrying out *Sherardising* and

*Arkrom* diffusion for the actual makers of such items as bolts, nuts, washers, hinges, scaffold fittings, nails, electrical conduit, chains, castings and pressings of all kinds.

## PLANT AND EQUIPMENT

Rigid thermoplastic pipes and moulded fittings from ⅜ to 6 in. nominal bore will be featured on the stand of **Durapipe and Fittings, Ltd.** These are supplied in three grades, Z, K and V. Z is high density Ziegler polythene. K, styrene/butadiene acrylonitrile blend, has excellent chemical and abrasion resistance and high impact strength with recommended working temperatures up to 170° F. V, rubber-modified high impact p.v.c., has a very high impact strength and excellent chemical resistance with a maximum temperature range up to 120°F. A notable feature is the extensive range of fittings up and including 6 in. nominal bore in these three grades of material. These various materials call for different methods of jointing which will be demonstrated at the exhibition. These include normal threading to B.S.P. specifications and heat and solvent welding.

*Sarkosyl* products made by the **Geigy Co., Ltd.,** are especially suitable as corrosion preventers for food use, since not only are they excellent inhibitors and dewatering agents for metal surfaces but they are also non-toxic and non-irritant; one of them is, in fact, used as an additive to toothpaste and shampoos, where it acts as a combination of detergent, bactericide, and corrosion inhibitor for metal packs.

The Sarkosyls are based on sarcosine (methyl glycine), and the products available at present are *Sarkosyl O* (oleoyl sarcosine), *Sarkosyl L* (lauroyl sarcosine), and *Sarkosyl NL* (sodium lauroyl sarcosinate), supplied at various concentrations.

*Sarkosyl O* is primarily useful as an additive to oils to confer upon them protective and dewatering properties, particularly for ferrous metal and galvanised surfaces. *Sarkosyl L* has similar properties but is less soluble in oils and more so in water and polar organic solvents: it also has protective action for copper and its alloys.

**Dough feeding hoppers lined internally and coated externally with "Calvinac" HR.321 cream to ensure hygienic conditions and low friction surface.**

*Sarkosyl NL* is freely soluble in water and protects ferrous metals and aluminium from corrosion in aqueous systems. It is also a mouth bactericide and a surface active agent.

These products are consequently recommended for use in food manufacturing and packaging and in kitchen procedures, as ingredients of detergents and of protective dips, rinses or oil coatings during idling periods. *Sarkosyl NL* may also be considered as a possible actual ingredient of non-staple foods such as salad cream to promote emulsion stability and to prevent corrosion of the container.

### Adhesive tapes

The range of corrosion control tapes made by **John Gosheron and Co., Ltd.,** are being featured, and their pipe protection qualities demonstrated. The various applications of *Polyvil P.P.* heavy duty p.v.c. tape will be shown including the wrapping of butt-welded joints on large pipelines and the continuous wrapping of extended runs of smaller pipelines involving the use of the *Viper* pipe wrapping machine.

*Vylap* self-bonding corrosion control tape will also be exhibited in respect of above ground applications where climatic conditions or heavily polluted atmospheres tend to cause rapid corrosion on exposed installations.

Particular emphasis will be placed on the wrapping of complicated joints and couplings. Two grades of *Polyvil P.P.* can be used for anti-corrosion protection by means of a two-stage wrapping method which will be clearly demonstrated.

*Transoprint* pipeline identification tapes will be exhibited to show how these can identify the contents of a pipeline at a glance by means of printed words or symbols on brightly coloured tape backgrounds.

*Contor* paper masking tapes will be featured for masking applications in spraying, sandblasting and general metal finishing processes, and Gosheron p.v.c., polythene and polyester tapes will be demonstrated for "stopping off" and masking out in electroplating and chemical etching processes.

Two new tapes, a vinyl and a

paper protection tape, will be exhibited to show how these materials have been developed for the protection of highly finished surfaces and laminates during production, storage and transport.

**Cathodic protection**

The contribution of **F. A. Hughes and Co., Ltd.,** to the prevention of corrosion is the system known as cathodic protection which they market under the trade name *Guardion*.

Cathodic protection utilises the same electro-chemical forces to prevent corrosion as those from which it arises. Whilst its use for protection of metallic structures is limited to those surrounded by an electrically conducting medium, such as water or moist ground, this very limitation means that it is often applicable to conditions where traditional methods of maintenance are difficult or even impossible.

Corrosion in water is caused by interaction between areas on the metal surface which have differing electro-chemical characteristics. Variations in surface conditions, coatings, degree of aeration and the salt content of the water are common reasons for this interaction which can also arise from irregular composition, millscale and differences in stress. The more reactive areas act as anodes and the less reactive as cathodes. These form local cells giving rise to chemical action and the release of electrical energy. The result of this action is to dissolve metal at the anodes while the cathodes remain unaffected. It follows that no corrosion would take place if the anodes could be suppressed and the whole of the surface rendered cathodic. Cathodic protection seeks to do this by arranging that the structure to be protected always remains cathodic in a controlled electrical circuit.

In the food industry this system is applicable to pasteurisers and hot and cold liquor tanks. For these particular applications it is most usual that the application of *Guardion* cathodic protection is in the form of an impressed current system using low voltage d.c. supplied from an external source. Silicon iron anodes, suspended within the pasteuriser or liquor tank, are connected to the positive terminal of the power supply while the tank itself is connected to the negative terminal of the same power source.

The firm's services are not limited to the supply of equipment but extend to pre-installation survey, design, supervision of installation and post-installation surveys as well as commissioning, while advice will be freely given concerning all corrosion problems in this particular or any other field.

**Plastic coatings**

**James Lithgow (U.K.), Ltd.,** manufacture and apply a range of *Calvinac* anticorrosive sprayed plastic coatings, applied to any metals. Included in this range are heat cured phenol formaldehyde resins which have been proved excellent for applications in the food industries, particularly so where a material is required which will completely prevent metallic contamination of products and provide a corrosion preventive coating which in itself is non-toxic.

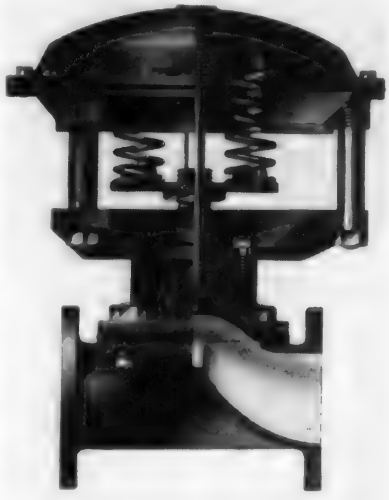
Examples of this include the lining of edible oil storage tanks, water tanks, lactose liquor tanks, liquid food mixing vessels, glucose tanks, invert sugar tanks, also pipelines, pumps, etc.

Other applications in the food industries include the lining of flour hoppers, dough chutes, mixing bowls, elevator buckets, and bulk handling equipment, where the smooth glossy surfaces afforded by the coatings have greatly reduced the adherence of powdery and sticky substances.

Because of their excellent anticorrosive properties *Calvinac* coatings have been used for the lining of lactic and acetic acid tanks and plant handling other organic acids used in the manufacture of pharmaceutical food products.

Plastic coatings for metal surfaces that prevent sticking as well as provide corrosion protection are among the wide range of products which will be exhibited by **Plastic Coatings, Ltd.** These include nylon-lined feed hoppers, p.t.f.e. coated chocolate slicing blades, and polythene coated mixing vessels. Other typical applications are: nylon coated ham moulds, the coating of which is non-toxic, can be sterilised, prevents staining of the ham by the aluminium, and at the same time facilitates release; p.t.f.e. coated marshmallow moulds, in which the non-stick properties of the film prevent the contents sticking to the tray; and p.t.f.e. coated bread tins which obviate greasing and subsequent cleaning of the tin.

An example of corrosion prevention on a large scale with the aid of surface coatings is provided by the 16 miles of 30-in. diameter steel submarine pipeline carrying water from Lantao to the island of Hong Kong. This is lined with *Prodorfilm* made by **Prodorite, Ltd.,** who offer a complete service to industry from the design to the finished installation. This covers chemical engineering and acid proof construction of all types, including tanks, floors,



**A Saunders diaphragm pressure operated valve. Pressure admitted above the head causes the valve to close against the combined effort of spring and line pressure. The diaphragm protects the operating mechanism against corrosion and abrasion and the material against contamination.**

*(Left):* **A nylon coated ham mould. This coating is non-toxic, can be sterilised, prevents staining of the ham and facilitates release.** *(Centre):* **A p.t.f.e. coated bread tin which obviates greasing and subsequent cleaning of the tin.** *(Right):* **A p.t.f.e. coated marshmallow mould.**

neutralising and effluent treatment schemes and fume extraction embodying a wide variety of corrosion resisting mastics, compounds and a complete range of new and improved corrosion resisting cements manufactured in this country by the firm under special licence from Farbwerke Hoechst AG.

A comprehensive range of corrosion resisting materials are available for use by firms who wish to carry out their own installation and maintenance, for which the firm's technical service and advice is freely available.

Examples of *Prodor-Glas* and *Prodorcote* synthetic linings and coatings for protection against beer, fruit-juices, milk, edible and crude oils, petroleum, diesel and high octane fuels, will also be shown, whilst liquid and sheet neoprene linings and coatings will show anti-corrosive, anti-abrasive and weather proofing protection for a wide range of plant and equipment. *Prodorplast* insulation coatings for jigs, racks and baskets used in the plating industry are also featured.

Plastic fabrications and piping installations in p.v.c. and polythene for corrosive fume extraction, tank linings, effluent treatment schemes, scrubbing towers, etc., are supplemented by *Orglas* resin/glass laminates; these materials are claimed to have outstanding strength/weight ratio and are resistant to practically all oxidising and non-oxidising acids, alkalis, and solvents up to temperatures of 120°C.; for temperatures between 120°C. and 160°C., *Orglas Y50* is available.

The Metal Finishing Division of the **Pyrene Co., Ltd.,** is exhibiting the the latest range of treatments for aluminium, the new *Parker* finishes P45B and P45C, the latest developments in the range of low temperature immersion *Bonderite* processes and the *Cold Bonderite* system.

**Aluminium treatment**

The range of treatments for aluminium has recently been augmented to include three new *Bonderizing* processes, namely: *Bonderite 710, Bonderite 701* and *Bonderite 740.* It also includes *Aluma-Etch 391.*

*Bonderite 710* is an oxide-chromate process specially suited to the bonding of paint to aluminium. It may also be used for mixed assemblies of aluminium with other metals.

*Bonderite 701* is another oxide-chromate process which produces a pleasant light-fast green coating on aluminium surfaces which is highly corrosion resistant in itself but may also be used as a base for paint.

*Bonderite 740,* another oxide-chromate treatment, provides an ideal key for paint and also possesses excellent anti-corrosive properties. It is primarily intended for treating aluminium in mixed production with steel.

*Aluma-Etch 391* is a scale-free, controlled alkaline etchant for uniformly etching the surface of aluminium.

The new *Parker* finishes P45B and P45C are quick air drying materials for use after *Bonderizing* or *Parkerising* to give maximum adherence and corrosion resistance. They may, if required, be overpainted.

The latest *Bonderizing* processes for steel produce excellent *Bonderite* coatings with reduced chemical consumption, lower operating temperatures, minimum treatment times and optimum corrosion protection.

The *Cold Bonderite* system, introduced in this country in 1958, is now well established and is a *Spra-Bonderizing* treatment. It is claimed to provide first class *Bonderite* coatings, coupled with drastic reductions in heating and maintenance costs.

**Valves**

The exhibit of the **Saunders Valve Co., Ltd.,** will pay particular attention to their remote controlled valves. It will contain a selection of their wide range of lined valves available, using rubbers such as neoprene and ebonite, metals such as titanium, and plastics such as nylon and polythene. The range of diaphragms is so comprehensive that virtually all fluids may be controlled by Saunders valves.

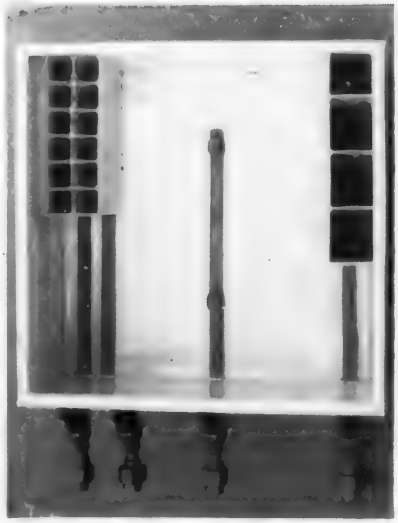
New developments on show will include a rubber lined, non-return valve and a solid p.t.f.e. valve. Diaphragm valves are especially suitable for the food industry because the mechanism is at all times isolated from the fluid under control; the diaphragm protects the operating gear from abrasive and corrosive attack at the same time as it shields the foodstuff from contamination. Where frequent sterilising is essential, the makers recommend either type L or type 070, which have bodies and

bonnets of polished stainless steel.

Products of the Safran Pump Division will also be on show, including a working *Safran* self-contained electric pump. There are a wide range of pumps, with capacities up to 900 g.p.m. Stainless steel units are suitable for the pumping of a wide range of food materials such as sauces, edible oils, etc.

The main emphasis on the stand of the **Tin Research Institute** this year is on tin-nickel plating, the particular virtue of which is its extraordinary resistance to chemical attack of all kinds. This is shown to advantage by a panel on which are mounted specimens of pure tin, pure nickel and tin-nickel plated brass, each set of three items having been subjected to a particular corrosive medium. The differences between the three materials are striking. This alloy consists of one atom of tin with one atom of nickel.

Porosity is the enemy of any metallic coating which is more noble than the steel which it is applied upon. It is therefore recommended that basis steel should first be covered with copper, as is customary in the plating industry, as a basis for the brilliant-tarnish resisting alloy coating of tin-nickel.



**A typical "Tufplas" fabrication of laminated unplasticised p.v.c. with a reinforcement of polyester resin and glass fibre. This installation was made for a pharmaceutical manufacturer.**

Tin-nickel can be used in contact with foods of all kinds because it is not affected by them, it imparts no taste or odour and is perfectly safe. Coatings of up to 0·0003 in. are usually adequate for most applications.

Pure tin coatings have been used for centuries to protect food from contact with iron and copper. The present exhibition shows that despite many competitive coatings, both organic and metal, tin is still preferred for a wide range of food and processing equipment.

A new material combining corrosion prevention with the purity required in the food industry is *Tufplas*, manufactured by **Tough Plastics, Ltd.**, a special form of which is designed exclusively for food use. The firm's bonding technique of laminating unplasticised p.v.c. with a reinforcement of polyester resin and glass fibre can be modified so that a white food grade of unplasticised p.v.c. is the contact material. This excludes the possibility of fibrous matter eventually reaching any food product, maintains an easily cleaned interior surface, and gives a high quality finish.

## *The Washington Congress*

# Vegetable Protein Problem nearly Solved

**Dr. A. E. Bender, who attended the Fifth International Congress of Nutrition held in Washington from September 1 to 7, writes this account of the proceedings, and says the main point was that protein foods appear likely to continue as the dominant interest during the coming decade. Some interesting estimates regarding the balance of future population and resources were made.**

THE Fifth International Congress of Nutrition, just held in Washington, emphasised two points. First, the rapid growth in interest in nutrition as exemplified by the numbers attending. There were 450 delegates at the Third Congress at Amsterdam, 900 at the Fourth in Paris, and 1,800 at the Fifth. Fear and trembling must surely seize hold of the organisers of the Sixth Congress, to be held in Edinburgh in 1963, if this rate of geometric progression continues.

The second point is the position of proteins as the centre of interest. Prof. J. F. Brock of Capetown designated the '50s as the protein decade; these foods appear likely to continue as the focus of interest for the '60s despite the pressure being exerted by the lipids.

### Success with vegetable protein

The outstanding reports at the Congress dealt with the great success being achieved in many parts of the world in preparing mixtures of vegetable proteins of local origin that are equivalent in concentration and quality to animal proteins.

It is only eight years since the start of the first organised attempts to attack the protein problem in various parts of the world, and in almost every country success is approaching. This work has involved seeking local sources of food rich in protein of high nutritive value, making such mixtures as would give the maximum nutritive value, preparing these in

a palatable and cheap form, testing them both in the laboratory and clinically, and finally, and this is perhaps the most difficult problem of all, making sure that they are acceptable to the population.

In South Africa, Prof. Brock has prepared a mixture of pea flour and maize; very great success has attended the efforts of Dr. Nevin Scrimshaw, of the Institute of Nutrition of Central America and Panama (I.N.C.A.P), who has produced a product known as *Incaparina*; in India, groundnut and Bengal pulses are being used; and there are similar reports from many other countries suffering from protein deficiencies.

The next stage, which is the problem of the food manufacturer or of governments, is to erect plant for the commercial manufacture of these materials under controlled conditions to safeguard the nutritive value of the product.

All this has been achieved in the past decade but the great interest in proteins looks likely to continue well into the next decade and even the protein foods of the Western World are being re-examined. The availability on a commercial scale of amino acids such as lysine and methionine makes possible the fortification of protein foods, and although doubt is often expressed as to the need for such fortification for Western diets, this procedure is already being carried out with breakfast foods and speciality loaves, and can be expected to expand considerably.

**Panel discussions**

A new feature of this Congress was the holding of Panel discussions. The Congress suffered from the drawback of all large meetings in that six series of papers were being read simultaneously, so making life difficult for the conscientious delegate.

One of these sessions was devoted to a Panel discussion, composed of six or seven invited speakers, whose papers were preprinted and available to the audience before the meeting. The speakers presented only a seven-minute abstract of their papers and the rest of the time was spent in discussion amongst themselves, the only audience participation consisting of sending up written questions. Some of the audience at times found this rather frustrating, but frustration is preferable to chaos.

The Panel discussions covered some of the major fields of nutrition; evaluation of nutritional status in man, proteins and amino acids in nutrition, lipids in health and disease, nutrition in maternal and infant feeding, effects of processing and additives on foods, animal nutrition and food production, and, finally, "three hours around the world—new possibilities in nutrition research."

The Panels varied considerably in their degree of interest depending largely upon the personal capacities of the contributors, their subject, and particularly on the moderators. For example, the Panel dealing with maternal and infant feeding included Dr. Paul György of the U.S.A., Dr. C. Gopalan of India, Dr. D. B. Jelliffe of Uganda, Prof. B. S. Platt of London, Dr. G. H. Beaton of Canada, and Dr. R. F. A. Dean of Uganda, under the direction of Dr. J. W. Clements of Australia, all outstanding personalities with a great deal of valuable information to exchange. This discussion could well have continued the whole day. On the other hand, the Panel discussing the effects of processing and additives to foods added nothing to what has been discussed in this journal and at meetings of the Food Group over the past two years.

The original communications of 10 minutes' duration, which were being read at the same time as the Panel discussions, were grouped together under some 30 headings so that papers of similar interest were read at the same session. An example of the interest in proteins is the fact that seven sessions were devoted to proteins in their various aspects, such as "animal studies," "man," and "amino acids"; seven were devoted to lipids and eight to the vitamins. Other sessions covered antibiotics, minor elements, germ-free animal studies, and minerals, as well as more general aspects.

As an example of the interest in amino acid fortification of foods, one entire session of 10 papers was devoted to lysine.

**15,000 m. people in 2040?**

The last day was occupied by a plenary session on World Food Needs and Food Resources. The morning session was opened by the Hon. Ezra Benson, Secretary of Agriculture, and closed by Mr. B. R. Sen, Director-General of the Food and Agriculture Organisation.

The paper that captured the imagination of the audience dealt with population, by Dr. James Bonner, of the California Institute of Technology. He considered the various extrapolations and estimates of world population that start from the figure of an increase of 45 million people per year, or doubling every 40 years. He allowed for reduction in deaths by famine and disease due to the application of science and technology, and the expected fall in birth-rate with the spread of industrialisation and estimated a total population of 8-9 thousand millions in 90 years time.

This may be an underestimate, as the rate of spread of control of death rate is usually more rapid than the calculated rate; e.g. halving the death rate that took 70 years to achieve in this country during the Industrial Revolution, was achieved in 40 years in Japan more recently, and in only seven years in Ceylon. Hence before the population stabilises in 80-90 years time the total might reach 15 thousand million.

On the other side, Dr. Bonner calculated the potential food production. The most rapid increase in agricultural production that has ever been seen took place in Mexico, aided by the Rockefeller Foundation, and showed 3% increase in production per year for 20 years. (This was later

(*Concluded on page 478*)

◀ The office block.

## *First stage in reconstruction programme at Bromborough*

# Stork Margarine Works' £1 million Extension opened

UNILEVER, LTD., threw a lavish party on September 29 to celebrate the opening of a £1 million extension to the Stork Margarine Works of Van den Berghs and Jurgens, Ltd., at Bromborough, Cheshire. The opening ceremony was carried out by the chairman of Unilever, Mr. George James Cole, in the presence of the Mayor and Mayoress of Bebington, directors of Unilever and associated companies, local dignitaries, trades union officials and members of the press.

The new extension—an ingredients block, a large production section and a visitors' reception wing—mark the completion of a major stage in a £3½ million reconstruction programme started in 1957. Already able to turn out some 150,000 packets of margarine per hour, the new production units have extra potential representing an important additional reserve capacity for the nation's food supplies. Employing 2,000 workers, the Bromborough plant is now among the largest and most up-to-date of its kind in the world.

Opening the extension, Mr. Cole referred to the many advantages which would flow from the reconstruction programme, including greater production potential, a more streamlined production process, and improved working conditions for employees. Speaking in general of margarine and vegetable fats, Mr. Cole emphasized their importance in relation to the problem of future generations faced with the possibility of a serious world shortage of food. "Let no one be surprised," said Mr. Cole, "at any new field of the fat market we may enter."

Mr. Cole then unveiled a plaque commemorating the fact that the world's first vitaminised margarine was produced at the Bromborough factory in January, 1927.

The extension will provide for extra production potential and will also help meet the demand for an increasing variety of margarines. There are produced not only many types of table margarine, but a range of cooking fats and special-

(*Left*): **The pre-mix platform for feeding the "Votators."** (*Right*): **Some of the 17 "Votators," each of which has a throughput of 90 lb. min. of margarine. In these machines the margarine is supercooled by ammonia refrigeration as it passes through a tube at a rapid rate, being continually turned over mechanically in the process.**

(*Top, left*): **The milk room, showing in the foreground the milk ripening vats, where skimmed milk is treated after pasteurisation with specially cultivated starters and allowed to mature for about 14 hours. In the background are the storage tanks for the plate pasteuriser.** (*Top, right*): **The refinery, where oils used in margarine manufacture, such as coconut, palm, cottonseed, whale, ground nut and other oils, are filtered, purified and deodorised under vacuum.** (*Bottom, left*): **The control panel in the compounding section, where blends are made up before the final texturing process in the "Votators." The mimic diagram enables the supervisor to see at a glance what is happening.** (*Bottom, right*): **A general view of the new production unit, showing the automatic batch weighers over the "Votators" on the right, and the wrapping machines on the left. The Silberkuhl roof has a special arrangement of windows and has a 120 ft. span clear of obstructions.**

ised products for the bakery trade. The extension will also provide even better working conditions for employees.

**New kind of roof**

Included in the extension is a new production unit and a new milk room. An unusual feature of the production unit is a new type of steel framework roof of German development, called *Silberkuhl*, after its inventor, which ensures maximum amount of natural light. With single spans of 120 ft., it also means that the entire factory floor space of 47,000 sq. ft. is free from supporting columns, thus aiding straight-line production.

Production of margarine in this unit, measuring 400 × 117 ft., is entirely automatic with the exception of the addition of vitamins. It is carried out by a battery of *Votators* which chill and partly solidify the ingredients, and then pass the mixture to automatic packaging machines. Also in this unit is the moisture testing room where four experts continually test random samples of margarine for moisture content which, by law, as for butter, must not exceed 16%.

The 120 ft. long, 65 ft. wide milk room, is completely new. It houses 12 stainless steel tanks, each with an 800 gallon capacity, and can handle up to 40,000 gallons of fat-free milk a week. It is here that the milk content of the margarine is first pasteurised, then cooled, inoculated with specially prepared "starters," and matured in the tanks until it has acquired the right flavour.

A new reception room and elaborate display gallery illustrating the production of margarine from plantation to packet, have been specially built for receiving visitors. In the display gallery the visitor can see a series of dioramas, showing in illuminated tableau form the various sources of raw materials for margarine, and photographs of the production process, murals and various attractively presented display units.

Since the reconstruction programme was started in 1957, a complete new administration block has been built, together with

(*Concluded on page* 482)

# GLUCOSE in sugar confectionery

By C. Trevor Williams

**Glucose plays an important part in preventing granulation. Different confections need different proportions, and powdered glucose may often with advantage replace sucrose. The modern trend is to use ready-prepared liquid sucrose/liquid glucose mixtures.**

ONE of the most valuable raw materials used in the sugar confectionery industry is glucose, which is produced in several forms, powdered, and liquid of varying dextrose equivalents and composition, each of which possesses its own particular physical and chemical properties. These properties, in turn, have a definite bearing on the stability of the final product.

The primary function of liquid glucose is the prevention or control of granulation of the sucrose constituent of a confection. In hard sugar goods, the prevention of granulation, or a high degree of retardation of granulation, is carried out in two ways; by the addition of an acid chemical such as cream of tartar (potassium acid tartrate) which hydrolyses a portion of the sucrose to form invert sugar, or by the addition of liquid glucose, which prevents or retards the rate of crystallisation without any chemical change taking place in the glucose itself.

Liquid glucose is more widely used since it may be added to formulations in varying, but controlled, amounts; the margin of tolerance is considerably greater than cream of tartar, and control of processing is greatly simplified especially in modern high speed production. In the case of acid "doctors," the process of cooking hard sugar goods must be minutely controlled with regard to the time of cooking, the amount of added acid chemical, the amount of water for dissolution of the sucrose, and the end-point temperature. Standardisation of all production factors is essential if the correct amount of inversion is to be achieved in each batch. Furthermore, the resultant mass is much more sensitive to the amount of manipulation it receives on the cooling plates and subsequent formative processes.

### Preparation and composition

Liquid glucose is normally produced by the hydrolysis of maize or potato starch by a mineral acid. There are variations in the time of conversion, and in the use of different converting agents. These agents may be dilute mineral acid alone, particular enzymes, a combination of acid and enzyme, or ion exchange, and by their use in the refinery a wide range of types of liquid glucose possessing any predetermined composition and proportion of dextrose and maltose may be produced.

All grades of liquid glucose, regardless of the degree of conversion, consist of the same basic ingredients: dextrose, maltose, higher sugars (polysaccharides), dextrine and water. The dextrose and maltose proportions increase as the conversion proceeds, the dextrines decrease. These factors must be considered according to the type of confection being produced.

It has been found in practice that a liquid glucose of approximately 40% D.E. (dextrose equivalent) is most satisfactory for use in the majority of confections now manufactured. The reducing sugars, dextrose and maltose, and the dextrines, the latter being the colloidal phase of liquid glucose, are perfectly balanced, and by adjusting the quantities in the formulations of different types of confectionery, a ready control of granulation of the sucrose content and the texture of the product may be achieved.

### Classification

Liquid glucose is usually classified into four main groups: low, regular, intermediate and high conversion. Low conversion glucose syrups are those having a dextrose equivalent of less than 40%. Up to the time of writing, the minimum dextrose equivalent value of a liquid glucose suitable for use in the production of confectionery is approximately 33-35%. This type of syrup is widely used in hard sugar goods, and possesses the property of reducing the rate of absorption of atmospheric moisture by the surface of the high boiled sweet, thereby exerting a beneficial effect on the shelf-life of the product.

Regular conversion liquid glucose, which is most commonly used in the confectionery industry, has a dextrose equivalent of 40-42%, and is suitable for practically all types of confectionery, from high boiled sweets to whipped confections, such as marshmallow and nougat, and jelly goods.

The intermediate and high conversion liquid glucoses would be used in confections where delicate texture and a higher degree of moisture retention are required. For instance, a liquid glucose of the high conversion type, having a dextrose equivalent of 63-66% would be most effective as a humectant in high final moisture content confectionery of which marshmallow and jelly products are examples.

Furthermore, as some confectionery pastes, such as cream paste, tend to dehydrate fairly rapidly, a proportion of high conversion liquid glucose in the formulation would retard the loss of constituent moisture effectively. This factor is most important in the cream pastes used in the manufacture of liquorice allsorts, where dehydration is most undesirable. In the past, glycerine was used

quite widely as a humectant in certain types of confectionery, but, with the development of high conversion liquid glucose, it has been entirely superseded by the latter.

The dextrose equivalent of a liquid glucose has a distinct bearing on the degree of granulation inhibition, the resistance of the final product to moisture attraction and loss, and the ultimate sweetness of the product. The higher the dextrose equivalent of the liquid glucose used, the greater the retention of moisture by the product since the reducing sugars, dextrose and maltose are in excess of the dextrine constituent. The latter colloid is generally accepted as being chiefly responsible for the property of granulation inhibition in confectionery.

*Stages in the manufacture of liquid glucose at the Trafford Park factory of Brown and Polson, Ltd.* (Top, left): *Starch is converted by hydrolysis with hydrochloric acid in these converters.* (Top, right): *The next stage is neutralisation with sodium carbonate.* (Bottom, left): *The precipitated protein and other impurities are filtered off in this precoated drum filter.* (Bottom, right): *The final concentration of the liquid glucose is affected in this triple-effect evaporator.* (By courtesy of Brown and Polson, Ltd.)

**How much to use**

The ratio of liquid glucose to sucrose in confectionery varies in accordance with the type of confection produced. Adequate amounts of liquid glucose, must, however, be incorporated to inhibit effectively the natural tendency of sucrose in super-saturated solution to re-crystallise. Generally, the proportion of sucrose/liquid glucose for hard sugar goods cooked by the open-pan method is approximately 4:1. This is often adjusted to 2:1 or 3:1 according to the type of hard sugar goods produced, and to economic factors.

In the case of vacuum-cooked hard sugar goods, the proportion of liquid glucose is increased, and the ratio becomes 6:4 sucrose/liquid glucose. This adjustment is found necessary in order to counteract the effects of turbulence in the cooking coils and other adverse factors during the cooking process by this method. These factors would tend to cause possible granulation if the liquid glucose were insufficient to counter this undesirable effect.

For the production of toffees and caramels, the ratio of sucrose/liquid glucose is usually 1:1. This proportion has been found satisfactory for cut or impressed pieces and for slab toffee. Where, however the toffee is passed through the modern cut and wrap machines which subject the mass to a considerable amount of tension, the proportion of liquid glucose is increased in the product to compensate for this factor, otherwise a state of granulation would be set up in the mass resulting in unsaleable goods. These precautions are also necessary in the production of toffees containing various types of nuts, as there is a tendency for the nuts to absorb moisture from the toffee adjacent to the nuts, causing fairly rapid granulation of the toffee.

Providing it is ensured that a confectionery formulation is correctly balanced, liquid glucose allows a manufacturer a fairly wide margin of tolerance in his proportions of sucrose/liquid glucose. He may adjust his formula according to the prevailing weather; in the summer months when the temperature is high, he will usually increase the proportion of liquid glucose to counteract dehydration, and decrease the proportion of liquid glucose during the colder, moister winter months to prevent or retard moisture attraction by his confections.

**Powdered glucose**

Powdered glucose, or dextrose monohydrate, is a white, crystalline substance, which, like liquid glucose, is produced by the hydrolysis of maize starch, and is the result of the complete conversion of the starch. It is a product of unvarying physical and chemical stability, which factors are of great importance to the confectionery manufacturer.

One of the most useful properties of powdered glucose is the fact that supersaturated solutions of this product re-crystallise much more slowly than equivalent solutions of sucrose. When, therefore, it replaces about 10% of the sucrose content of the confection, particularly in high content goods, granulation is retarded quite considerably, and the shelf-life of the

product is prolonged for substantial periods of time. As an example, in a fondant the syrup phase is in a stabilised state, and no further crystallisation should take place in the mass. This state of equilibrium is largely achieved by correct "doctoring."

When a mixture of sucrose and powdered glucose (in conjunction with liquid glucose) is used, there exists between the two sugars a mutual tendency to retard the process of crystallisation. The presence of powdered glucose in fondant results in a finer crystalline structure in the mass, a shorter and softer texture, and, on account of its negative heat of solution, it produces a cooling sensation on the palate.

As the viscosity of a solution of powdered glucose is lower than that of a sucrose solution of equal concentration, this property is most useful for increasing the fluidity of sucrose/liquid glucose/gelatine, syrups used in the manufacture of gums, jellies and pastilles. The mass will flow more freely from the depositor nozzles, and "tailing" is eliminated. The property of low viscosity of powdered glucose solution is also valuable in marshmallow and nougat production, as the increased mobility of the mass allows rapid whipping, resulting in a lighter product.

The replacement of a portion of the sucrose constituent by powdered glucose in starch-filled confectionery, such as starch gums and jellies, and Turkish Delight, leads to an improvement of the texture of these goods. Powdered glucose modifies the physical structure of the confection giving rise to a shorter texture, thereby making the sweet less "gummy." The dehydration of colloid-containing confectionery is a hazard adversely affecting the shelf-life of such products. By using, however, the moisture-binding property of powdered glucose, which is slow to give up contained moisture even in high relative humidity conditions, dehydration in gums, jellies and pastilles is retarded sufficiently to prolong the shelf-life for a substantial period. This is due to the fact that admixtures of sucrose and powdered glucose produce stable solutions of higher concentration.

**Ready-to-use mixes**

Confectionery manufacturers are becoming increasingly interested in liquid sucrose/liquid glucose syrup mixtures, which are made up in the proportions required. These ready prepared syrup mixtures allow the manufacturer to cut down his production costs, simplify manufacturing procedure, and streamline his plant.

Their use provides a further essential step in a continuous processing system, eliminating the handling of two separate raw materials, sugar and liquid glucose. In practice, it is possible and, in many cases, probable that greater consistency in the initial added water content of a confectionery batch would be achieved by the use of prepared syrups.

## Vegetable Protein Problem nearly Solved

(*Concluded from page 473*)

discussed by Mr. J. G. Harrar of the Rockefeller Foundation.) Such a rate of increase required the aid of every possible technical and fiscal effort and would be beyond the capabilities of most countries; 2% would be more feasible. This is a doubling in 50 years and thus barely keeps abreast of the population increase. The maximum limits of food production can be estimated in various ways, and Dr. Bonner considered that if half the world achieved the efficiency of Japan and the other half achieved the efficiency of Western Europe, and the cultivable area were increased by 50%, 8-10 thousand million people could be supported and this could be achieved in 70-80 years. To achieve that unknown figure of an "optimal" population, with a safety margin, would call for a very well-controlled birth-rate.

This balance of population and resources set the stage for the day's discussion and Mr. Sen stated that the Freedom from Hunger Campaign, started on July 1, 1960, was designed to focus attention on this problem.

**Social features**

The social side of the Congress was dealt with extremely thoroughly with typical American hospitality. The Congress was greatly honoured by the presence and speech of President Eisenhower, which caused many delegates to make an obvious suggestion for the opener of the next Congress when it is held in Edinburgh. In addition to a large-scale reception and the closing banquet, there was a symphony concert and an evening of American folk music. The ladies were well catered for, even to the extent of having personal hostesses as guides and advisers.

During the banquet the President of the International Union of Nutritional Sciences, Dr. D. P. Cuthbertson, Director of the Rowett, presented a silver tray to Dr. Leslie Harris, Director of the Dunn Nutritional Laboratories at Cambridge, on his retirement after 14 years as Secretary-General of the International Union.

One valuable feature that is well worth copying at the forthcoming Congresses to be held in this country was an invitation to foreign visitors to dine with an American family. Delegates usually meet fellow scientists and see the inside of an hotel and the outside of a town, but rarely get the opportunity of going into the house of any member of their host country.

The delegates covered the greater part of the world and came from 65 countries, with the surprisingly large contingent of 60 from Great Britain. The Americans, under the Presidency of Dr. Charles Glen King and the Chairmanship of Dr. Paul György, lived up to their reputation as good organisers.—A. E. BENDER.

# The Adulteration of Foods Act, 1860

## *A Centenary appreciation of the first British legislation*

By John Burnett,* M.A., LL.B.(Cantab.), Ph.D.(Lond.)

**Uninformed comments in the press and elsewhere in connection with the recent Pure Food Centenary celebrations have revealed widespread misconceptions concerning the first Act and its historical background. This article, by a social historian who has made a study of dietary changes in Britain, assesses the real place of the Act of 1860.**

IN 1860 the first general attempt was made by legislation to control the quality of food sold to the community. For more than 50 years past there had been a growing outcry from doctors, chemists and social reformers at the suspected extent of food adulteration in England, and full-scale investigations in the 1850s had finally proved that these suspicions were more than justified. The responsibility of the state towards the health of the community had already been established, in some measure, by the Public Health Act of 1848: to extend this responsibility to the sale of food and drink seemed an easy and logical step.

### Utter failure of the first Act

Yet the Adulteration of Foods Act which was passed in 1860 was an utter failure. In common with much Victorian social legislation, it was exposed to all the failings of permissive adoption—the arguments of economy, the consideration due to vested interests, the sheer lethargy and inertia of much unreformed county administration. Under the Act, various local authorities (the Commissioners of Sewers in the City of London, Vestries and District Boards in the Metropolis generally, and the Courts of Quarter Sessions in the counties) were empowered to appoint Public Analysts who would examine samples of food "on complaint made" by private individuals.

No provision was made for random sampling: all the officer could do was to wait for suspected articles to be brought forward by those public-spirited enough to pay a fee of up to 10s. 6d. for each analysis.

Trade opposition prevented the adoption of the Act over wide areas, and during the 12 years of its existence only seven Analysts were appointed throughout Great Britain. Four of them did nothing at all. Two more had a few samples submitted to them during the first year or so, but none subsequently. One of these, Dr. Henry Letheby, the Public Analyst for the City of London, was called on to examine 57 in the course of nine years; although 26 were found to be adulterated, in no case were proceedings brought before the magistrates in accordance with the provisions of the Act.[1]

Only Dr. Charles Cameron, the Medical Officer of Health and Public Analyst for Dublin, demonstarted how energy and initiative could transform a lame measure into effective operation. Between 1862 and 1874 he analysed 2,600 samples, reported nearly 1,500 as adulterated, and successfully obtained convictions in 342 cases.[2]

This was the inauspicious beginning of the elaborate system of food controls which now protects the British consumer. Despite the failure of the Act to remedy the evils which it set out to cure, it is worth recalling the events which led up to it and the more effective measures which ultimately followed.

In 1860 legislative interference with the free workings of the economy was still exceptional and limited in scope. The mere attempt to interpose a law between seller and buyer represents a major breach in the structure of "laissez-faire" which, although its practical results were small, should not pass unnoticed.

### THE POSITION BEFORE 1860

It is true that the evil which the Act of 1860 failed to remedy was of relatively recent growth. Food adulteration was peculiar to an age of rapid industrialisation and urbanisation, and although occasional references to it may be found in medieval literature it is clear that its use was not then widespread. Certainly there was no organised attempt to deceive the public, and the crude, isolated cases which occurred were easily suppressed by vigilant local authorities.

### Widespread adulteration

By the closing decades of the eighteenth century, however, the quality of many foods was rapidly deteriorating, and it is beyond dispute that for most of the next hundred years adulteration was an exceedingly widespread and highly remunerative commercial fraud.

In the process of industrialisation traditional rural skills—of which baking and brewing were economically the most important—disappeared over wide areas of the country, and the housewife became increasingly dependent on the professional producer. Important changes also affected the function and status of the retailer himself, as capitalism, with its larger unit-size and powers of distribution, gradually invaded the leading food trades.

Wholesalers and agents of various kinds became interposed between producer and retailer, and in many cases achieved a

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dominating position. Thus, as specialisation advanced, the ultimate consumer became further and further removed from the food producer, and in the process the old, local relationships and sanctions which had served to protect him largely broke down. At the same time the central and local regulation of food, inherited from the Middle Ages, came to be discontinued—partly because of administrative difficulties, but, more fundamentally, because of a changed climate of economic opinion.

Here then were the essential causes of adulteration—a rapidly growing population pressing on the means of subsistence, food consumers divorced from food producers and no longer protected by legislation. The final impulse was provided by the French Wars. Shortages and bad harvests combined to raise prices to unprecedented levels, while heavy taxation on many foods forced down profit margins. In circumstances of intense competition many producers and retailers were driven to adulterate in order to survive.

**Accum's treatise**

Public complaints about adulteration were first heard on a significant scale in the 1790s, but it was not until 1820, when the well-known analytical and industrial chemist, Frederick Accum, published his "Treatise on Adulteration of Food and Culinary Poisons" that the subject was discussed in a thoroughly dispassionate and scientific way.

Accum examined in detail the frauds practised on some two dozen articles ranging from bread and beer to wines, spirits, tea and condiments. He found that bread was frequently adulterated with alum in order to whiten "seconds" flour and so pass off the loaf as being made from the more expensive "firsts"; potatoes, beans and peas were also occasionally added.

Two years earlier a Select Committee of the House of Commons had discovered large quantities of ground Derbyshire stone used by bakers in several Midland counties. Tea, reported Accum, was often manufactured from native English hedgerows, the leaves of ash, sloe and elder being curled and coloured on copper plates; there were eleven prosecutions by the Excise for this offence between March and July, 1818, and an official report estimated that 4,000,000 lb. of the rubbish were annually manufactured here compared with the 6,000,000 lb. of genuine tea imported by the East India Company.

The adulterations of ale and porter were even more serious. A class of "Brewers' Druggists" had appeared, carrying on a regular trade in cocculus Indicus (a deadly poison containing picrotoxin), multum, capsicum, copperas, quassia, "mixed drugs," Spanish liquorice, hartshorn shavings, carraway seeds, ginger and coriander; these, and many other articles, were used as cheap substitutes for malt and hops, allowing beer to be diluted by giving it a false appearance of strength and flavour.

Sulphuric acid was available to "age" new beer, marble dust and oyster-shells to "recover" it when stale. Accum also exposed the practice of giving a nutty flavour to wines with bitter almonds, and the colouring of cheese rind with red lead.

A wide variety of evidence drawn from parliamentary papers, trade literature and scientific investigations suggests that adulteration increased in succeeding years to reach a peak in the decade 1840-50. John Mitchell, an analytical chemist who had carried out researches over 12 years, reported in 1848 that he had never found a sample of bakers' bread which did not contain alum; the usual quantity was about 100 grains to the 4-lb. loaf, but he had occasionally found whole crystals the size of a pea. He had examined samples of flour containing chalk and pipe-clay.

A very common adulteration of beer was with sulphate of iron or "heading," which enabled publicans who diluted their porter to still serve it with a frothing head—regarded by the customer as a sign of strength. Again, by 1848, pure coffee had all but disappeared from the market: it contained large proportions of chicory, roasted corn, the roots of various vegetables and earthy matters such as ochre. Mitchell had even found in coffee a substance which appeared to be baked horses' liver.[3]

**"The Lancet" plays a part**

Shortly afterwards came what was easily the most thorough examination and most powerful influence in the history of the subject—the series of articles commissioned by *The Lancet* which appeared each week between 1851 and 1854. More than 2,400 analyses were made by the author, Dr. Arthur Hill Hassall, who was able to bring many new facts to light by his development of the microscope as an aid to detection.

His general conclusion was that almost all foods were adulterated which it would pay to adulterate. Bread could nowhere be obtained free from alum; cocoa nearly always contained large proportions of sugar, starch and coloured earths; oatmeal was cheapened with barley and refuse husks; tea was adulterated twice—in China and again at home; sugar confectionery was coloured with red lead, Prussian blue, Brunswick green, vermilion and arsenite of copper, while the sugar itself was often replaced by sulphate of lime.[4]

Hassall's work gave for the first time some kind of quantitative assessment of the extent of adulteration, and some indications of its possible effects. He estimated, for example, that over £7,000,000, representing about one-tenth of national revenue, was lost to the Exchequer each year by the adulteration of dutiable articles alone.[5]

On this calculation, the total loss to the consumer on all items of consumption must have been some tens of millions, and there can be little doubt that a large sector of retail trade was permanently maintained by fraudulent means.

Although all classes of the com-

munity were affected, the loss fell principally upon the poor, who, until the advance of real wages in the 1860s and '70s were often unable to escape from indebtedness to local tradesmen to find pure food in higher-priced shops and co-operative stores.

### Numerous deaths

More important still, but even less capable of statistical measurement, were the effects on health. Occasionally these were immediate and spectacular, as, for example, at Drouitt's Institution in 1850, when a large number of pauper children died from eating adulterated oatmeal. Numerous deaths were also caused by poisonous colouring matters, and by the fortification of beer and spirits with narcotics.

Far more often, however, adulteration affected health in an indirect way by reducing the nutritional value or inhibiting the digestibility of a food—as in the watering of milk and the aluming of bread. In this kind of adulteration, which was the most widespread and persistent of all, may well lie part of the explanation of the prevalence of chronic gastritis and stomach disease, the undernourishment, physical deterioration and high infant mortality, which characterised life for many in early Victorian England.

## THE MOVEMENT FOR REFORM

Hassall's work for *The Lancet*, and the wide dissemination which it received through popular literature and the press,[5] was the starting-point of the movement for reform. Many well-known doctors —Henry Letheby, Alphonse Normandy, John Simon, Robert Dundas Thomson, John Mitchell and Sir John Gordon—enthusiastically took up the cause, but the man who engaged himself most indefatigably and most effectively in the campaign was the Birmingham surgeon, John Postgate. Throughout 1853 and 1854 he was in constant correspondence with supporters, addressing public meetings up and down the country, and forming local societies to campaign for suppression. It was, in fact, a letter which he wrote to William Scholefield in January, 1854, suggesting a Parliamentary enquiry, which led to the appointment of a Select Committee of the House of Commons on Adulteration the following year.

### Select Committee's report

From the publication of the Committee's Report in 1856, completely endorsing Hassall's findings, it was certain that legislation must shortly follow. But although Parliament and the nation had been convinced of a great and growing evil, wide differences of opinion existed as to the remedy to be adopted. There were many still like Viscount Goderich who looked in the first place for voluntary reform by traders and an extension of co-operative retail of food.[6] At the other extreme, Hassall demanded the creation of a Central Board of analysts, with imprisonment and public exposure as the penalty for adulterators. (As late as 1880 the total membership of all co-operative societies was only 600,000.) Others again favoured the practice of France, where local "Conseils de Salubrite" harnassed the expert knowledge of doctors, chemists and veterinary surgeons to guard the purity of all foods, drinks and drugs. (The first "Conseil de Salubrite" was established in Paris in 1802: most French provincial towns followed the example during the next two or three decades.)

The Adulteration Act of 1860 was therefore a compromise, steering an uncertain course between conflicting views. No central authority was established. The responsibility for ensuring food purity was to be a local, and purely optional one. A fine was to be the normal penalty for adulteration, with imprisonment only in default of payment, and a seller who could produce evidence that he had himself been deceived, and was unaware of the adulteration, was not to be held culpable.

The Act did not include drugs. To the bitter disappointment of radicals like Hassall and Postgate, the first Food Act passed into the statute-book and into oblivion.

### Adulteration continued after 1860

For at least another decade adulteration continued at a high and dangerous level. A lecture delivered to the Royal Society of Arts in 1861 demonstrated that 87% of the bread and 74% of the milk sold in London was impure, and when Hassall extended his survey to the provinces he found that what was true of London was equally true of Manchester, Birmingham, Leeds and Liverpool.

In the previous year three guests at a public banquet died after eating green blancmange which had been coloured with arsenite of copper, while the deadly cocculus Indicus was still used to "strengthen" beer at least as late as 1874.

It is noticeable, however, that the character of the problem was changing, and that with the development of more accurate scientific tests, cruder frauds gradually came to be abandoned in favour of more subtle methods which had a short run of success until they too were exposed. Again, between 1860 and 1870 a number of larger food manufacturers and retailers began voluntarily to put their houses in order and to supply, sometimes against considerable opposition, a pure article.

Yet it is quite certain that voluntary forces alone would never have proved a sufficient remedy. Even when a choice became available, the mass of consumers were still too poor, too ignorant or too prejudiced to exercise it rightly.

### A new Act passed

By 1870 pure food was accessible to the middle-class and to those of the working-class who could escape from indebtedness to the local chandler to join a co-operative society;[8] the rest—and much the larger section—had to wait for any significant improvement in the quality of their food until the advent of effective, compulsory legislation.

Throughout the 1860s a stream of criticisms and demands for more adequate safeguards was kept up by the reformers. *The Lancet* continued to provide the spearhead of the attack, supported by the Royal Society of Arts, the Social Science Congress, and individuals, among whom Postgate and Letheby stand out. Hassall demonstrated by further investigations that although some slight improvement had taken place, an urgent problem still awaited solution in London and the leading provincial towns.[7]

In 1868 John Postgate laid before Parliament a series of radical amendments to the 1860 Act which, after numerous delays and modifications, eventually passed into law as the Adulteration of Food, Drink and Drugs Act, 1872.

The most important provision in the new Act was the extension of the power of appointing Public Analysts to all boroughs having separate police establishments. Appointment was still to be optional "save on the direction of the Local Government Board," so that here for the first time an agency of central government was given responsibility for the purity of food.

The Board used its power cautiously and wisely, gradually bringing moral pressure to bear on those authorities which still hesitated to adopt the Act; within three years 150 of the 225 districts qualified to appoint Analysts had done so, and more than 1,500 convictions for adulteration had been obtained.

**Gradual improvement**

Much of the success of the measure lay in the fact that Inspectors of Nuisances and other local officers were given power to procure samples for analysis, and no longer did the Analyst have to rely on public-spirited citizens to bring forward suspected articles. In some progressive towns a regular system of sampling and analysis was instituted which quickly yielded results.

Further improvements to the law were made by the Sale of Food and Drugs Act, 1875, which, among other things, provided that Public Analysts were to make regular returns to the Local Government Board.

From these statistics it is possible to trace in clear detail the gradual conquest and suppression of adulteration. When returns were first published in 1877, 19·2% of all the random samples examined were found to be adulterated: by 1900 the figure had fallen to 8·8%, and in 1913 it stood at 8·2%.[8]

A spectacular improvement in the quality of our basic foods was achieved in the 1880s, so that by the end of Victoria's reign the consumer generally received his bread and flour, his tea and sugar, as pure as he could wish. Some items still presented an intractable problem which showed little improvement over the years —10% of all milk was still adulterated in 1900, 12·4% of spirits, and 13% of beer. But the chief offence in these cases was simple dilution; deliberate, dangerous adulteration for the sake of gain had been eliminated.

In this good result voluntary improvement by the trade, stimulated by the gradual emergence of a public opinion better informed about dietary matters, unquestionably played an important part. But, as the failure of the 1860 Act demonstrated, effective legislation was the essential condition of a general improvement in the quality of food. For the last hundred years it has been recognised that the protection of the consumer is a proper and necessary function of the state: two World Wars, the recurrence of shortages and inflation, and, above all, the continual introduction of new food products and processes, have now made it a permanent feature of social legislation.

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## Stork Margarine Works, £1 million Extension Opened

(*Concluded from page* 475)

a health centre and a control laboratory. The health centre's facilities include treatment rooms and the surgeries of the works doctor, dentist and chiropodist.

By 1963, the former production unit will have been completely rebuilt, as well as a comprehensive personnel services block.

The Bromborough works turn out about 3,000 tons per week of edible products, including such brands as *Stork, Summer County, Blue Band, Echo, Spry* and *Cookeen*. Mr. J. D. Buxton, Director of Van den Burghs and Jurgens and factory manager of the Stork works, said that during the floods of 1953 which put the Purfleet factory out of action for six weeks, by heroic efforts the Bromborough works reached an output approaching 5,000 tons per week.

*Footnote:* Unilever has now entered the butter market with a blend of imported butters under the brand name of *Farm Bell*. This was launched in the Birmingham area on October 10. The Van den Burgh wheel thus turns full circle, for it was in the 1860s that the company changed from butter to margarine manufacture.

# ADVANCES in FOOD TECHNOLOGY

## CANNING

### *Corrosion of cans*

Research work has been carried out at the Berlin Institute for Food Hygiene on certain corrosion phenomena encountered in food cans. The investigations covered the macroscopic and microscopic evaluation as well as the fixation of existing corrosion phenomena by means of the chromatographic printing method developed by Hutschenreuter. This method permits a precise distinction between "marbling" and corrosion, as its use is confined to the detection of iron sulphide. It was found that cans containing certain meat products, *e.g.* goulash and pork, are particularly prone to develop corrosion, as they are richly spiced with products containing sulphur compounds and free fatty acids. By using lacquered cans, it is possible to reduce the interaction between can metal and contents considerably.—R. Mossdorf, *Die Fleischwirtschaft*, 1960, **12**, 443.

## CEREALS

### *Effect of remixing*

If unleavened doughs are tested in the Brabender extensigraph according to the structural relaxation procedure, they yield hyperbolic structural relaxation curves irrespective of whether they are or are not remixed before shaping. However, remixing causes a decrease in the structural relaxation constant and in the asymptotic load. The effect increases with increasing duration of remixing. The effect on the structural relaxation decreases when the time interval between remixing and shaping increases from 3 to 20 mins.; this is called recovery. Recovery may or may not be complete in 20 mins., but under the conditions of the present experiments it does not proceed beyond that time interval.

Doughs to which 35 p.p.m. N-ethylmaleimide are added are least sensitive to remixing, closely followed by doughs with 12·5 p.p.m. iodate. Doughs with 20 p.p.m. bromate and doughs without additions but mixed in an atmosphere of oxygen show a large effect of remixing. With bromated doughs the effect of remixing increases considerably with reaction time. After recovery the rank order of doughs with different additions has remained essentially the same. Recovery of doughs with N-ethylmaleimide is even complete for reaction times shorter than 60 mins. Doughs mixed in an oxygen atmosphere and remixed in nitrogen hardly show any recovery; if the remixing is done in an oxygen atmosphere, however, recovery is considerable.

Results obtained with the Brabender and Halton extensigraphs show that at least part of the effect of remixing is due to interference with subsequent structural activation during shaping of the test piece. Possibly differences between flour improvers that change rheological dough properties rapidly and slowly are more important than differences between oxidising and thiol-blocking reagents.—A. H. Bloksma and I. Hlynka, *Cereal Chemistry*, 1960, **37**, 352.

## MEAT PRODUCTS

### *Cooking temperature of Frankfurters*

Finnish research workers have investigated the influence of prolonged cooking time at normal cooking temperature (72°C.) and the influence of prolonged cooking time and higher cooking temperatures (up to 90°C.) on the bacterial count and on the species of bacteria in Frankfurter type sausages. It is possible to increase the cooking time and/or temperature without impairing the quality. In either case, the bacterial count is substantially reduced and the keeping time correspondingly increased. At the same time, shrinkage during processing is thereby reduced. As regards the bacterial flora, certain species disappear altogether after 2 hrs. cooking at 72°C., and the total bacterial count is thus reduced to a fraction of that encountered in normally cooked sausages. An increase in the cooking temperature will also affect the bacterial flora, but does not lead to a complete disappearance of the species concerned.—F. P. Niinivaara, M. S. Pohja and W. Kreuzer, *Die Fleischwirtschaft*, 1960, **12**, 437.

### *Ultrasonic determination of live pig fat*

The German Institute for the Breeding and Genetics of Domestic Animals, Göttingen, has developed an ultrasonic method by which it is possible to ascertain, in the live hog, the deposits of fat and the ability of forming lean meat. A chart produced by this method shows the fat/lean meat pattern of the animal in the same way as a pattern drawn from the carcass so that the yield can be reliably predicted.—A. Diekmann, *Die Fleischwirtschaft*, 1960, **12**, 447.

### *Aureomycin additions to pig fodder*

Tests have been carried out at the German Federal Meat Research Institute, Kulmbach, in order to find out whether the quality of canned ham for export may be affected by aureomycin additions to hog rations. Three pairs of animals of the same litter were used. One group was fed on normal rations, one on rations containing aureomycin, and one on rations additionally containing *Aurofac*; in all cases, the hams were processed in the normal way. The investigations included bacteriological tests for aureomycin in the lean meat and organs of the freshly slaughtered animals as well as on the brines and on the finished canned hams. The tests showed that there was practically no difference between the animals. This also applies to the organoleptic examinations which were carried out by examiners unaware of the identity of the animals. It is, therefore, concluded that the addition of aureomycin to hog rations has no adverse effect on the bacteriological or organoleptic condition of export-class ham.—F. Kelch, *Die Fleischwirtschaft*, 1960, **12**, 439.

## STERILISATION

### *Evaluation of disinfectants*

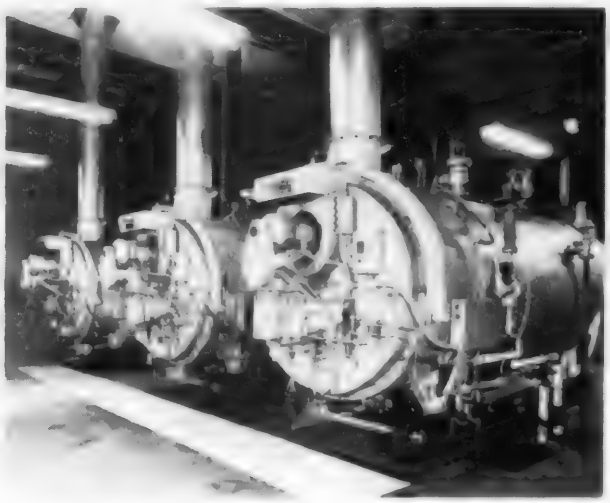
The Institute for Bacteriology and Histology affiliated to the Federal German Meat Research Institute, Kulmbach, has worked out a proposed standard procedure for the laboratory examination and practical examination of disinfectants for meat processing plants. An effective disinfectant is expected to inhibit completely, for a period of three days, the growth of certain species of micro-organisms if applied at a minimum concentration of 0·02% at optimum incubation temperature. The disinfectant must also be able, in the concentration specified by the manufacturer, to kill the test bacteria in a density of approx. $10^7$ per milli-litre at 20°C. within a period of five minutes. In field tests, the disinfectant is expected to show a practical disinfection value of at least 95% on smooth metal surfaces and at least 75% on wooden surfacts.—K. Coretti, *Die Fleischwirtschaft*, 1960, **12**, 381.

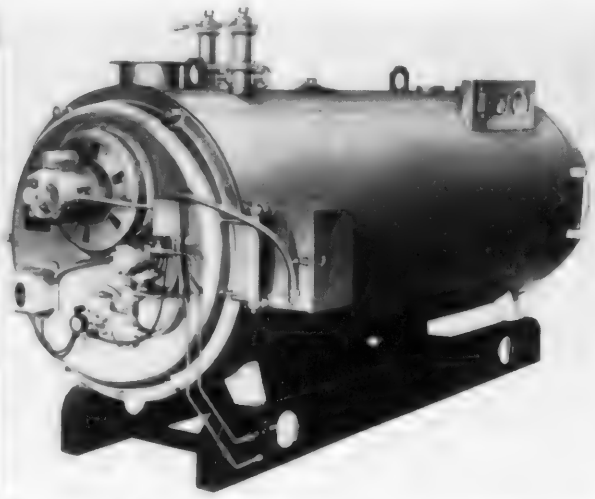
## VEGETABLES

### *Uptake of strontium*

Experiments are described in which a range of cereals, root crops and brassicas were grown in sand using culture solutions containing strontium 89. The distribution of the tracer in the mature plants of the cereal grains is reported and illustrated using auto-radiography. The mode of uptake of fall-out radio-strontium by plants in the field is discussed and the present results are interpreted in terms of the extent to which man's selection of particular parts of plants may affect the levels of radio-strontium in his own immediate diet.—R. B. Duckworth and J. Hawthorn, *J. Sci. Food Agric.*, 1960, **11**, 218.

# MACHINERY and EQUIPMENT





**Marshall packaged units.** (*Left*): **An installation of two CB 350 and one CB 300 packaged boilers.** (*Right*): **A typical P type water heater.**

### PACKAGED BOILERS

At the recent Factory Equipment Exhibition in Manchester, Marshall Sons and Co., Ltd., exhibited one of their packaged steam generators and one of their packaged water heaters. The steam generator was the CB 100 fully-automatic oil-fired packaged boiler, rated at 3,450 lb./hr. from and at 212°F. at a working pressure of 150 p.s.i.

The CB range of boilers consist of steam raising units with ratings from 1,380 to 20,700 lb./hr., designed to burn any grade of fuel oil or gas. They are four-pass horizontal firetube boilers with 5 sq. ft. of heating surface per rated boiler horsepower, and are mounted on a heavy steel frame. Both front and rear doors open to expose the tubes and fire side surfaces for inspection and servicing. The burner and controls are mounted on the front head at a convenient level for operation, service and inspection, the controls being contained in a dust proof panel. The *Fireye* flame failure and programming control is claimed to give complete protection under all operating conditions. Also forming an integral part of the front head is a forced draught blower providing secondary air for combustion.

The makers say that each CB boiler is guaranteed to operate at a fuel-to-steam efficiency of over 80% between 30 and 100% of rating and at designed working pressure, indicated by a stack temperature approximately 150°F. above saturated steam temperature at operating pressure and a flue gas analysis of 13.5% $CO_2$ when firing with oil.

The P 20 fully-automatic, packaged oil-fired water heater also shown has an output of 670,000 B.T.U./hr.

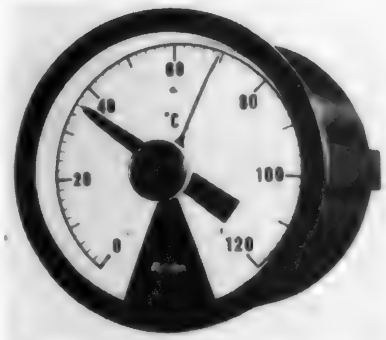
The range of P type water heaters consists of units from 500,000 to 1,340,000 B.T.U./hr., designed to burn oil or gas. The boiler is a four-pass horizontal fire tube unit with 5 sq. ft. of heating surface per rated boiler horsepower, and is mounted on a heavy steel frame with integral forced draught blower and burner controls. The unit is pre-assembled for immediate installation, factory tested and ready for attachment of water, fuel, electrical and vent connections.

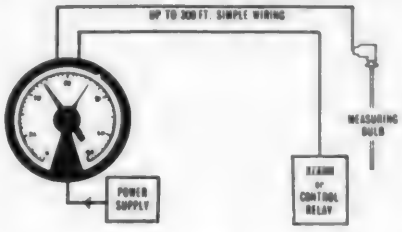
Most modern hot water heating systems with their high flow and low return water temperatures subject boiler shells to severe temperature gradients. The Marshall-built Cleaver-Brooks system introduces the cooler water return into the boiler at a point and in a direction which provides the longest tempering path attainable. Thermal shock is, therefore, eliminated, it is claimed, and uniform water temperatures are maintained.

### COLD STORE CLOTHING

A one-piece suit with a full length zip and elastic sleeves and ankles (or with adjustable straps) has been introduced by J.C.P. (Industrial Clothing), Ltd. Insulated with kapok fibres, it is suitable for use in temperatures well below −40°C., and is claimed to be air-blast proof. It is covered with a two-piece outer suit of well-ventilated polythene weighing only 4 oz. and consisting of trousers and hooded jacket fitted with a draw-pull. The jacket is secured by adjustable tapes, and there is a large flap pocket on the side secured by press studs.

**This new insulated suit is claimed to provide protection in temperatures below −40°C.**






(*Left*): **This new temperature indicator - controller in the "Bikini" range can be used up to 300 ft. from the measuring point with simple wiring.**

(*Right*): **The Babcock-Ramm atomiser, for producing powders from liquids or fluid concentrates.**

## CONTROLLED DRYING

New equipment for the evaporative processing of liquids into concentrates and powders is to be manufactured under licence in this country by Babcock and Wilcox, Ltd., under the name of *Babcock-Ramm*.

In the *Babcock-Ramm* atomiser, a liquid or fluid concentrate is fed to an ultra-high-speed atomising turbine and converted to a fine "mist" which is dried by heated air to a powder. This is extracted under controlled temperature with cyclone separators.

The *Babcock-Ramm* rotary concentrating evaporator may be used by itself for the rapid and hygienic concentration of milk, fruit and vegetable juices, jams, etc., under low-temperature vacuum conditions, and is also complementary in function to the atomiser, producing concentrates for conversion to powder in that machine. An important feature is the patent, steam-heated stainless steel rotor which rotates within the main chamber, presenting a very large continuously moving heated surface. Solvent recovery can be provided for.

## TEMPERATURE CONTROLLER

A new electronic temperature indicator-controller is now available in the Fielden *Bikini* range of instruments for temperature measurement. It is housed in a 6 in. diameter panel-mounting case and has a 13 in. scale calibrated in °C or °F. in any of 73 standard ranges for temperatures between −200°C. and +850°C. (−330° to 1,550°F.). The control point is set by a pointer operated from the knob in the centre of the dial, whilst the indicating pointer is motor-driven from a servo-system.

The instrument is completely transistorised for reliability and no maintenance is required. It can be operated from 12 volts d.c. or the usual mains supply.

The flush-mounting meter-type case takes up a minimum of panel space and combines modern appearance with ease of installation.

The platinum resistance measuring bulb used with the indicator-controller is housed in a robust stainless steel sheath of ¼ in. diameter and can be located at any distance up to 300 ft. away from the instrument. The control relay, which has contacts rated at 10 amp. to provide both changeover and "normally open" switching can be located up to 300 ft. or more distant from the instrument if required.

**A press drive from a 5 h.p. 950 r.p.m. motor; the right hand picture shows the "Spacesaver" drive which replaced the belt drive in the left hand picture. Drive weight was reduced from 33 to 20 lb.**

## WEDGE-BELT DRIVES

New wedge-belt drives incorporating terylene cords encased in synthetic rubber cut drive space by a half and belt cost by a fifth, say the makers, J. H. Fenner and Co., Ltd. The new belts, known as *Spacesaver*, are available in two sections, ⅜ and ½ in., which, it is said, cover every normal drive up to 200 h.p., and a range of belt lengths and pulley diameters is available for all usual drive requirements.

(*Left*): **The printing ink on this Metal Box polythene broiler pack was specially formulated for deep-freeze conditions.** (*Right*): **Seven varieties of Meredeth and Drew's range in their new packs made from Metal Box's "Diolam."**

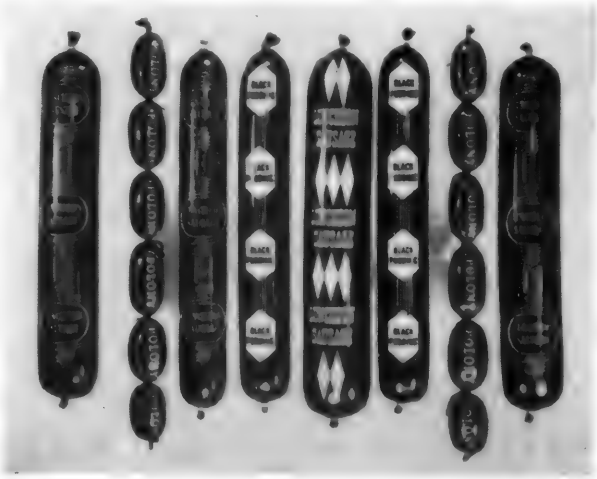
### New cellulose casings

Viskase, Ltd., announce the addition of special sizes and colours to their range of clear and coloured-opaque casings for slicing sausage of the luncheon, breakfast and black pudding varieties. The luncheon casings are made in a shade of opaque red to sizes from 5½ to 11 in. circumference, while the black pudding casing is available in clear or black-opaque to the 8½ in. size. These sizes and colours are introduced essentially to suit British retailing needs.

The range of precision cellulose casings is designed to suit products of the luncheon sausage type, where the selling price cannot justify the use of more expensive fibrous casings, yet ease of filling by unskilled operators, uniformity, and freedom from bursts is required.

### Free printing offer for ham packs

Viskase, Ltd., are offering free printing on their special Christmas pack for hams. The *Zephyr* casings are printed with a modern, eye-catching design in red, green, and white to get the best presentation for cooked hams and shoulders this Christmas. Sample printed casings are now available on request. Bulk orders should be placed before November 11 for despatch first week in December.



**New cellulose casings from Viskase, Ltd., which are claimed to give the ease of filling and freedom from bursts hitherto associated with the more expensive fibrous casing.**

### New chicken pack

A new pack for Buxted Chicken Co.'s broilers has been produced by the Plastics Group of The Metal Box Co., Ltd. It is made of *Diothene* polythene and is printed in blue and red with printing ink specially formulated by Metal Box to withstand deep-freeze conditions. Research and design work on the new pack took nearly a year.

### Cartons for flour

The first carton for packing flour to be produced by E. S. and A. Robinson, Ltd., is now being used by Cold Storage Bakeries, of Malaya.

In this country the use of cartons for flour is considered uneconomic, as the basic cost of the contents is so cheap and the competition among millers is so great. In Malaya, however, the competition has reached a point where the cheapness of the pack is no longer the prime consideration, and some millers are even packing the flour in tins.

To meet this competition, Cold Storage Bakeries are now using a four-lap, glued carton of white-faced chipboard, contining 2 lb. of flour in a cheap liner bag. The carton is attractively litho-printed, using four colours, in a design featuring a number of cakes and pastries on a red background.

The use of a carton for flour has a number of obvious advantages over bags, including ease of stacking during storage and display.

*(Top, left):* **The use of "Shrinkwrap" for overwrapping a number of articles has been developed, and the picture shows a selection of suggested uses.** *(Top right):* **New flour bags by Robinsons are made from cellulose film lined with bleached kraft.** *(Bottom, left):* **"Seal-Easi" self-adhesive bands are used to make up these C.W.S. biscuit packs.** *(Bottom right):* **Liver paté wrapped in a heat-sealing protective foil material supplied by the Robinson Waxed Paper Co.**

### Foil wrapper for sausage meat

Liver paté by C. and T. Harris (Calne), Ltd., is now being supplied in loaf form wrapped for protection and freshness in a bright foil material printed with a red, white and black design, supplied and printed by the Robinson Waxed Paper Co., Ltd. It is *Lustrafoil W*, made from foil glue-laminated to an inner liner of waxed paper, with a coating on the foil to permit heat-sealing; it is supplied in cut sheet form.

It is claimed that the foil wrapper keeps the paté in peak condition without drying out, and also prevents contamination from the odours of other foods.

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### New use for shrinkable film

The use of *Shrinkwrap* for overwrapping a number of items has been developed by E. S. and A. Robinson, Ltd., a technique which is claimed to offer a number of advantages both during transit and for wholesale and retail packs. This material is produced by cross-tensilising and re-orientating the molecules of *Pliofilm*, which is made by the Goodyear Tyre and Rubber Co., Ltd. It forms a heat-sealable, transparent film which can be shrunk by the application of moderate heat to form a "skin-tight" glossy overwrap on almost any shaped article. The effect of applying heat—generally between 190-200°F.—is to return the molecules to their former state, so causing a shrinkage of up to 50% in the area of the film.

**Viskase, Ltd., offer free printing on their special Christmas packs for hams.**

The new use involves the overwrapping of a number of similar articles or units, an idea which is not, in itself, new as cellulosic film has been used for this purpose for some years—particularly for overwrapping a number of jars of jam. Advantages claimed are a stronger and more rigid pack, which will not tear if accidentally punctured; the material itself is not brittle, and the cost of overprinting a wrapper is avoided as the film is transparent so that the design on the overwrapped article is clearly seen.

The overwrapping can be applied by hand for short runs, and automatic machinery is now being developed.

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### Collapsible polythene tubes

Universal Metal Products, Ltd., are now supplying decorated oval tubes made from polythene under the trade name *Umpoval*.

In common with all U.M.P. plastic tubes they have a buttress thread, and are fitted with a similarly threaded cap to eliminate overriding of the cap.

Protective lacquers have been evolved for both *Umpex* and *Umpoval* tubes, and can be supplied as required, to suit a wide range of products.

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### Sales unit fosters "impulse buying"

A new corrugated fibreboard merchandising unit made by Reed Corrugated Cases, Ltd., has been produced for the retail display of *Corona* soft drinks. Attractively produced in special materials overprinted in two colours, it is simple to erect yet claimed to be rigid and robust in use. It is one of many types made by Reeds, each styled to display to maximum advantage the product concerned. Many of them can also be used as shipping containers.

**Merchandising units like this one, made by Reed Corrugated Cases, Ltd., not only act as attractive "silent salesmen" but in many cases form robust shipping containers as well.**

# NEWS DIGEST

## Pure Food Centenary Celebrations

The Pure Food Centenary Celebrations in London commenced with the opening of the Centenary Exhibition on Tuesday, September 20, and ended in a blaze of glory at a banquet in the Guildhall on Friday, September 23.

In between were three paper-reading sessions at the Royal Institution, a Government reception at Lancaster House, and a reception by the directors of Unilever at Unilever House.

The Centenary Exhibition, at Charing Cross Underground Station, was opened by the Minister of Agriculture, Fisheries and Food, the Rt. Hon Christopher Soames, C.B.E. In his speech, he said that the public analysts, by unremitting work and steady improvement of their techniques, have brought under control the menace of deliberate food adulteration, and that there is little basis for the suspicion that processed and preserved food is less wholesome than might be liked.

The Exhibition, which was open until October 8, represented laboratories typical of the 1860 and 1960 periods, and was the first attempt that had been made to place a working chemical laboratory on show before the public. The primitive apparatus of 1860 was displayed, together with a chemist of the period in appropriate costume. By contrast, the well-fitted laboratory of 1960 showed microscopes and the simpler types of analytical apparatus in their most refined form.

The Congress was opened on the following day at the Royal Institution by The Earl Waldegrave T.D., Parliamentary Secretary (Lords) to the Ministry of Agriculture, Fisheries and Food. At the paper reading sessions on the mornings of Wednesday, Thursday and Friday, papers were presented by Dr. J. D. Hamence, Dr. E. B. Hughes, D. J. G. Malloch, Dr. N. C. Wright, Dr. C. A. Morrell (Canada), Prof. F. H. Reuter (Australia), Mr. J. L. Harvey (U.S.A., who read Dr G. P. Larrick's paper), and Prof. A. C. Frazer.

The culminating ceremony was the banquet in London's historic Guildhall

*(Top, left):* **The Minister takes a sniff. Mr. Christopher Soames, who has just opened the Pure Food Centenary Exhibition at Charing Cross Underground Station, is shown round by Mr. T. McLachlan [left], chairman of the Exhibition Committee. The Mayor of Westminster, Councillor Everest, is on the right.** *(Top, right):* **Food microscopy, 1860 and 1960, at the Exhibition.** *(Bottom, left):* **The board of Unilever gave a reception at Unilever House for delegates to the Centenary Congress; the picture shows (left) Mr. George Cole, chairman of Unilever, talking to Dr. Norman C. Wright, Deputy Director-General, F.A.O. With them is Mrs. Cole.** *(Bottom, right):* **The Lord Mayor of London, Sir Edmund Stockdale, escorts Mrs. A. J. Amos into the Guildhall for the Centenary Banquet. Following is Lady Stockdale with Dr. A. J. Amos, chairman of the Pure Food Centenary Executive Committee.**

on the Friday evening, in the presence of the Lord Mayor of London, Sir Edmund Stockdale, and Lady Stockdale. The Congress was attended by 330 delegates, 42 of them from 21 countries overseas. The Executive Committee, under the chairmanship of Dr. A. J. Amos, and the Exhibition Committee, under the chairmanship of Mr. T. McLachlan, are to be warmly congratulated on the excellence and efficiency of the organisation, which made the celebrations so memorable and pleasant for those taking part.

### Prince Philip to visit the National College

H.R.H. Prince Philip, Duke of Edinburgh, will visit the National College of Food Technology, Weybridge, Surrey, on Friday, December 16, and formally declare the College open.

It will be remembered that His Royal Highness was prevented from opening the College on February 19 by the birth of Prince Andrew on that day.

### Standard cure for Ayrshire bacon

A code of practice for the production of Ayrshire bacon has been published by the Pig Industry Development Authority.

Based on the recommendations of the Association of Scottish Bacon Curers, the British Bacon Curers' Federation, and the Authority, the code covers all aspects of the cure, from transporting the pigs to rolling the bacon.

Copies of the code are available from PIDA's Scottish office at 5, Duke Street, Edinburgh 1.

## Dietetics Congress in London in 1961

The third International Congress of Dietetics will be held in Church House, Westminster, London, S.W.1, from Monday, July 10 to Friday, July 14, 1961. The Congress theme will be *Tradition, Science and Practice in Dietetics*, and it will be open to members of dietetic associations or allied professions throughout the world.

A provisional scientific programme has already been drawn up, and includes paper reading sessions addressed by experts of international repute. The honorary president of the Congress is Lord Boyd Orr, and the chairman is Miss D. F. Hollingsworth. The organising committees are the International Committee of Dietetians and the British Dietetic Association. The registration fee for all members will be £6 6s. (U.S. $18.00), with an additional charge of £3 10s. for the Congress dinner on Wednesday, July 12.

Particulars and application forms can be obtained from the office of the Secretariat, 251, Brompton Road, London, S.W.3.

# Biological Testing Station gets D.S.I.R. Grant

## *British Industrial Biological R.A. formed*

A D.S.I.R. grant of £22,000 per annum for five years, the formation of an organisation to be known as the British Industrial Biological Research Association, and a guaranteed income from industry of at least £23,000 per annum are the main developments in the setting up of a biological testing station.

The companies in the food, chemical and allied industries to which the provisional committee appealed for support have so far guaranteed just under £23,000 per year. At a general meeting of supporting companies on April 21, the provisional committee was reappointed as a steering committee and the terms of a draft application to the D.S.I.R. for an industrial research grant were approved. The present members of the steering committee are: Mr. D. W. Collier (Cadbury Brothers, Ltd.); Dr. P. P. Hopf (A. Boake, Roberts and Co., Ltd.); Dr. C. G. Hunter (Shell Research, Ltd.); Mr. A. Norton (Rowntree and Co., Ltd.), Mr. R. K. Sanders (The Metal Box Co., Ltd.); Dr. T. A. Smith (I.C.I., Ltd.); Mr. H. W. Vernon (W. J. Bush and Co., Ltd.); and Mr. R. P. Woollard (London Oil Corporation, Ltd.).

The application was submitted to the D.S.I.R. at the beginning of June, and since it was considered by the D.S.I.R. on June 28, it has been announced that an immediate grant of £22,000 per year for five years will be made, with an extra grant of £100 for every additional £100 contributed by industry in excess of £22,000 up to a maximum additional grant of £25,000 per annum.

The project is thus assured of an immediate income of £44,000 per annum, and could receive as much as £95,000 per annum if industry were prepared to find half that sum.

The B.F.M.I.R.A. have agreed in principle to make available two acres of their land at Leatherhead as the site of the biological testing station, and have also agreed to provide certain secretarial and administrative services for the station in the initial stages. The steering committee's plan, as outlined in its application to the D.S.I.R., contemplates that the station will be built at an estimated capital cost of £56,000 and run on an estimated annual expenditure (when fully operating) of about £40,000. It is expected that most of the capital cost of building and equipping the station will be met in the first two years before the station comes into full operation.

It has been agreed that the companies supporting the project should form themselves into a research association on the D.S.I.R. pattern called "the British Industrial Biological Research Association." The steering committee has approved a Memorandum and Articles of Association for the B.I.B.R.A. and these will shortly be submitted to the Companies Registration Office. The first general meeting —the so-called "statutory" meeting —of the Association is to take place on December 8, when the main business will be to elect a Council to manage the Association's affairs in the next phase when so many vitally important decisions will have to be taken.

### Next Mechanical Handling Exhibition

The next Mechanical Handling Exhibition, claimed to be the world's largest display of all classes of industrial labour-saving and ancillary equipment, will be held at Earl's Court, London, from May 8 to 18, 1962. It will be the eighth in the series of this biennial exhibition which started in 1948. Information can be obtained from H. A. Collman, Dorset House, Stamford St., London, S.E.1.

### Rownson Conveyors, Ltd.

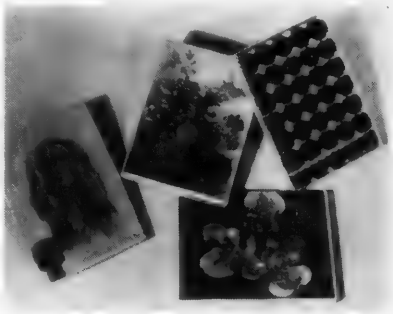
A change of title is announced by Rownson (Conveyors), Ltd., who became members of the Baker Perkins Group last June. The company will now be known as Rownson Conveyors, Ltd.

The address and telephone number remain unchanged: — Maiden Lane, York Way, London, N.7. (Gulliver 7721.)

### Stainless Steel Plant, Ltd.

The A.P.V. Co., Ltd., have acquired an interest in the business of Stainless Steel Plant, Ltd., of Cleveleys, near Blackpool, which has been fabricating plant and equipment in stainless steel for several years.

The management will remain and the company will continue to operate as before.



*The first Christmas range from the new Lyons subsidiary, Rolls Confectionery, are these boxes of Mint Chocs.*

## Europe's biggest cold store now complete

### *Opening of Birds Eye extensions at Lowestoft*

Birds Eye Foods, Ltd., now have the biggest frozen food cold store in Europe. New extensions of 9,000 tons were opened by Mrs. A. D. Bonham-Carter, wife of the Unilever Director responsible for the co-ordination of Unilever Companies in the United Kingdom, on October 6.

This 13,000 tons cold store will hold something over 60 million cartons of quick-frozen food. The newly-built storage space of 9,000 tons has been added to the existing 4,000 ton Birds Eye cold store at Lowestoft, opened in 1958 by the Postmaster General.

Greatly increased production by Birds Eye is the reason for these two additional chambers but the knowledge that further growth can be expected at Lowestoft made the project even more imperative. Industry sales will exceed £50,000,000 this year and in five years time are expected to be more than twice that figure. Birds Eye claim that their share of this market is in the region of 70%.

The Lowestoft factory is one of five owned by this company—the others are at Yarmouth, Grimsby, Liverpool and Eastbourne—and is mainly concerned with the production of vegetables, fish, fruit and pastry products. It employs well over 1,500 people at the height of the season and over the past 15 years has made a very real contribution to wards the prosperity of this region.

Smiths Insulations, Ltd., have built all stages of these cold stores; the two stages which have been built since February this year give one complete store finally, roughly in the form of a "T." The first part, the upright of the "T," measuring 180 ft. long by 170 ft. wide and 20 ft. high was in operation in July with a temporary insulated wall at one end where the other part of the store would join it at the top of the "T."

Designed for an operating temperature of −20°F., insulation throughout consists of 8 in. of expanded polystyrene on the walls and ceiling and 10 in. cork on the floor.

The floor of precast slabs, is elevated to tail-board height, providing an air flow underneath to prevent frost-heave and giving a measure of safety against the high tides sometimes experienced on this coast.

The granolithic floor was laid in reinforced panels and walls and ceiling are finished Polar White. A corrugated asbestos roof and aluminium cladding give a bright, modern look to the building.

The refrigeration equipment for this 1,300,000 cu. ft. cold store is by J. and E. Hall, Ltd.

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### Firms and the vehicle testing scheme

Can firms possessing their own workshops for their fleet of vehicles become vehicle examiners in the vehicle testing scheme?

Mr. R. E. G. Brown, London Secretary of Traders' Road Transport Association, says: "Such firms are in precisely the same position as public garages in this matter. If they have the necessary equipment and facilities they are free to apply.

"They can, however, only be appointed as 'public examiners,' as the Act makes no provision for any other kind.

"As such they would be required to make their facilities available to the general public."

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### Merger of bulk dairy producers

On September 1 two of Britain's largest manufacturers of bulk dairy produce merged to form Unigate (Milk Products), Ltd. They are Golden Glow, Ltd., a member of the Cow and Gate group, and Wilts United Dairies, Ltd., Bulk Sales Department. Both companies already form part of the new Unigate Group.

Products include spray and roller dried milk powder, condensed and evaporated milk, butter, cheese and other dairy products.

### Anglo Swiss Food Products, Ltd.—change of address

Anglo Swiss Food Products, Ltd., announce their change of address from 37, Queen Square, London, W.C.2, to Wellington House, 125/130, Strand, London, W.C.2 (Covent Garden 0011).

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*The latest product from Heinz is Dried Horse Radish in 2¾ oz. jars. It recalls the fact that grated dried horseradish was Variety No. 1. In 1856, when only 16 years old, Henry John Heinz, grandfather of the present chairman of the company, started to grate and bottle horseradish grown in his mother's garden in Sharpsburg, Pennsylvania, and at the end of his first year of trading he had sold 2,400 dollars worth.*

### Simon show roll machine

An A.M.F. *Union Pan-O-Mat* machine for high speed automatic roll or bun production has been installed in the showroom of Henry Simon, Ltd. Those wishing to see this machine should write to Mr. D. G. Elias, manager of the Bakery Machine Division, Cheadle Heath, Stockport, suggesting two alternative dates for the visit.

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### Henry Simon and A.M.F. link up

Henry Simon, Ltd., announce that a new company, Simon-A.M.F., Ltd., is being established in the U.K. to sell and install the most up-to-date automatic bakery machinery and equipment.

Associated with Simon in this new company is the American Machine and Foundry Co. of New York, one of the world's largest manufacturers of machinery for the bakery industry. Henry Simon, Ltd., has for some time represented A.M.F. in the sale of bakery machinery in the U.K., and also holds a licence for the manufacture of this equipment. Such manufacture will begin shortly at the plant of Simon's wholly-owned subsidiary T. and T. Vicars, Ltd.

A.M.F. manufactures bakery machinery in Europe, in Mexico and in Australia, in addition to its plants in U.S.A. The company is also joining with Henry Simon, Ltd., in the establishment of a continental sales company, A.M.F.-Simon International S.A., with headquarters in Geneva, Switzerland.

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### Corrosion congress

The 1st International Congress on Metallic Corrosion will be opened on Monday, April 10, 1961, by the President, Sir Harry Melville, K.C.B., D.SC., F.R.I.C., F.R.S., and will be followed by the first scientific session for the presentation and discussion of papers. The following four days will each start with a plenary lecture to be given respectively by the following eminent authorities in the field of metallic corrosion: Professor Y. M. Kolotyrkin (U.S.S.R), Professor P. Lacombe (France), Professor H. H. Uhlig (U.S.A.), and Dr. U. R. Evans (U.K.).

Scientific sessions will follow the plenary lectures until lunch time on each day and will also be held on Wednesday and Friday afternoons. On Tuesday and Thursday afternoons instead of scientific sessions, a variety of visits to laboratories and industrial organisations is being arranged.

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### Prestcold—change of address

With the completion of their new factory at Swansea, the Prestcold Division of the Pressed Steel Co., Ltd., announce that their new address is Swansea, Glamorgan.

# Committee urges better milk

Main conclusions of the Cook Committee, whose report on the composition of milk was published on September 21, are that milk makes a valuable contribution to health, particularly through its content of solids other than fat (known collectively as s.n.f.), and that consumption should be increased. Changes in the fat content of milk are not recommended; the evidence of a link between either atheroma or coronary disease and milk fat is regarded as suggestive, but not conclusive.

Both the fat and s.n.f. contents of milk have been declining gradually over the last 30 years in England and Wales, but have remained comparatively static in Scotland. The committee think that most milk producers could improve the composition of their supply by changes in herd management if they were given a sufficient incentive to do so.

The dairying industry should, therefore, seek to improve the s.n.f. content of the milk supply. As a first step, the Milk Marketing Boards in Great Britain should pay less than the normal price for supplies deficient in s.n.f. To enable this to be done, the composition of milk supplies from farms will need to be tested regularly by the dairy or depot to which they are first consigned. The Northern Ireland Milk Marketing Board have already proposed a more comprehensive scale of payments depending in part on the solids content of the milk, and it is accepted that this may be more suited to the local conditions of Northern Ireland.

The present presumptive legal standards are designed to ensure that milk is genuine; they do not prevent the sale of genuine milk of low composition. They are largely outmoded, since it is now possible to detect adulteration by a comparatively simple laboratory test, and they should be replaced by fixed minimum standards as soon as possible. The measures to be taken by the Milk Marketing Boards should lead to a general improvement in milk composition and it should be possible within ten years to prohibit the retail sale of whole milk containing less than 3% fat or 8·5% s.n.f. Standing Committees should be appointed to advise Ministers on milk composition in England and Wales, Scotland and Northern Ireland.

It is important to compile information about the s.n.f. performance of individual animals comparable to that which has been built up for fat, so that milk producers can manage their herds to best advantage. Milk recording should, therefore, cover s.n.f. as well as fat and there should be changes in the proving of bulls used for artificial insemination and in the licensing of bulls under the Improvement of Livestock Act.

The Cook Committee was appointed in May, 1958, under the chairmanship of Prof. J. W. Cook, Vice-Chancellor of Exeter University.

### Polak and Schwarz—change of name

International Flavors and Fragrances, Inc., announce that with effect from October 1 the name of its Dutch company, Polak and Schwarz International N.V., changed its name to International Flavors and Fragrances I.F.F. (Nederland) N.V.

At the same time, Polak and Schwarz (England), Ltd., changed its name to International Flavors and Fragrances I.F.F. (Great Britain), Ltd.

### Danish bacon factory at Selby

The Danish Bacon Company's factory for pre-packed bacon at Selby was taken over by the Danish Bacon Factories' Export Association on October 5. It will now work under the name of Danish Bacon Packers, Ltd., with Mr. Bruce Robinson, former managing director of Messrs. Horowitz, Manchester, as managing director and Mr. C. Arnett as technical director. The price paid to D.B.C. was £250,000.

The chairman of the Danish Bacon Factories' Export Association, Mr. Dons Christensen, said this did not mean a new sales offensive on the British market. Danish bacon factories, like other suppliers, had a natural desire to prepare for further development in the market for pre-packed bacon now so evident. It was, he said, in the best interests of everybody — producers, trade and consumer—that the packaging should take place where the durability and uniformity could best be secured, and the quality properly maintained.

### Meredith and Drew, Ltd.

To meet the growing demand for the company's potato crisps, Meredith and Drew are increasing production facilities by the provision of additional automatic plant.

Shareholders will be offered a number of new ordinary and "A" ordinary shares in the ratio of one new share for every 15 shares now held at 20s. 6d. per ordinary and "A" ordinary share.

An interim dividend of 3% (less tax) on the Company's present capital, has been declared. The new shares to be issued will not participate in this interim dividend, but, in all other respects, will rank *pari passu* with the company's existing ordinary and "A" ordinary shares.

Subject to unforeseen circumstances, the board expect to be able to recommend a final dividend for the year, to December 31, 1960, of 5% (less tax) on the capital as increased by the present issues.

## OBITER DICTA

- In Florida". . . coin operated rending machines promote sales.—*Naarden News.*
- The roast beef of Old England has long been superseded in popularity by fish and chips.—*Press release.*
- Seventy-five thousand patrons dine at The Wagon Wheel yearly—they don't know any better.—*Advert. in Irish Times, quoted in Daily Telegraph.*
- "There is nothing like an egg done on a nice clean shovel," said Driver Tom Stevenson, who drove on yesterday's test run. — *The Times.*
- When Cortes and his Conquistadors carved their bloody road through the Aztec Empire, this ancient civilisation was eating popcorn.—*Concessionaire.*
- The price of human food should certainly be higher than dog biscuits; it was the trade's fault that bread was cheaper than dog biscuits.—*Bakers' Review.*
- The information obtained will aid studies of human resources at total performance capacity, not only for space living but in the event of total war on this planet. — *Press handout.*
- The kitchen of tomorrow could be furnished like a library, with ornamental packages of dehydrated food on shelves round the walls. It might not be necessary to go shopping more than once a year.—*News Chronicle.*
- We learn that Coca-Cola contains sugar, caramel, caffeine, phosphoric acid, cinnamon, nutmeg, vanilla, glycerin, lavender, lime-juice and various citrus oils, but no coca and precious little cola. — *Financial Times.*
- The Isle of Man Local Government Board is afraid that if they ban the importation of ice cream, the United Kingdom will retaliate by prohibiting the importation of Manx kippers. — *Ice Cream and Frozen Confectionery.*
- The average steak or roast, he writes, "probably comes from a cow born through artificial insemination, raised with an artificial sex hormone implant in its ear, fed synthetic sex hormones . . . slaughtered, generally by an inhumane method, and sold as meat."—*Book review in Science.*
- Can anyone explain why it is that unshelled prawns are sold by the pint and not by weight? One always has a nagging suspicion that the measuring vessel has not been stuffed as tightly as possible with these delectable crustaceans; might there not have been room for just *one* more?—*Letter in the Times.*

# PEOPLE

Stafford Allen and Sons, Ltd., have appointed MR. JOHN BAILEY as their Midland area representative.

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DR. V. L. S. CHARLEY, PH.D., B.SC., technical director of H. W. Carter and Co., of Coleford, Gloucestershire, a subsidiary of Beecham Foods, Ltd., has taken up a new appointment in the Product Research Division of Beecham Foods, Ltd., at Brentford, Middlesex. As director, Product Development, he will be concerned with current and long-term developments in the field of fruit juice products at home and abroad.

MR. A. E. BILLINGTON, M.A., A.R.I.C., has been appointed to take charge of Product Research work at the Coleford laboratories in succession to Dr. Charley.

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The analytical instrument activities of Southern Instruments, Ltd., will in future be carried out in the name of Southern Analytical, Ltd., a company newly formed for the purpose. Members of the board will include MR. W. B. HORNER, general manager, MR. H. M. DAVIS, B.SC., A.R.I.C., A.INST.P., chief engineer (late of U.K.A.E.A), and MR. J. A. COLLS, A.R.C.S., B.SC. The chairman is MR. PHILIP SELLARS, vice-chairman of Southern Instruments, Ltd.

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## Obituary

The death has occurred at his home in Greenock of MR. WILLIAM NORMAN WALKER, a member of the Greenock family of sugar refiners, aged 66. He was a director of John Walker and Co. (Sugar Refiners), Ltd., and of the Greenock Bulk Handling Co., Ltd. He was captain of the Greenock Cricket Club from 1932 to 1934, and played eight times for Scotland.

Mr. Walker served throughout the First World War, and in France he won the Military Cross, and left the service with the rank of captain. In the last war he joined the Home Guard and held the rank of colonel. He was a former president of the Greenock Chamber of Commerce.

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SIR CHRISTOPHER SHEEHY, Chairman of the Australian Dairy Produce Board, has died in Brisbane, aged 65. He had been a key executive in Australia's dairying industry for over 30 years and held many important posts in Queensland, including those of Secretary of the Queensland Wheat Board; Secretary of the Queensland Council of Agriculture; Secretary—later Manager—of the Queensland Butter Board; and a Member of the Dairy Produce Control Committee, which discharged important marketing functions under wartime conditions, from 1939-48.

Mr. G. Jackson

Mr. F. X. White

MR. R. S. POTTER, B.SC., F.R.I.C., has relinquished his position as managing director of William Evans and Co. (Hereford and Devon), Ltd., following the recent sale of the goodwill of the cider and liquid pectin interests of the company to H. P. Bulmer and Co., Ltd. Mr. Potter will be setting up as a technical consultant to the food and brewing industries.

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Certain changes have been made in the board of directors of A.M.F., Ltd. MR. GORDON JACKSON has been appointed chairman, MAJOR-GENERAL G. D. G. HEYMAN and MR. G. M. R. LORD become joint managing directors.

New appointments to the board also include MR. ADRIAN LEGG and MR. S McLENNAN, who becomes finance director of the company.

Before joining A.M.F. Mr. Gordon Jackson was manager of the Nuclear Power Division of Mitchell Engineering, which appointment he is retaining in order to provide continuing co-ordination between the two companies in this field.

MR. FRANK X. WHITE, vice president of A.M.F. International, said the new organisation was in line with the group's plans for a programme of continued integration and expansion in Britain.

# Forthcoming Meetings

**S.C.I. Food Group,** Thursday, November 3: joint meeting with S.C.I. Nottingham Section, 7.30 p.m., in the Gas Showrooms, Parliament Street, Nottingham, "A Food Technologist in the U.S.A.," by S. W. F. Hanson.

Wednesday, November 9: 14, Belgrave Square, London, S.W.1, 6.15 p.m., "Food Technology in Italy" (report and film of 1960 Summer Tour).

Wednesday, November 23: in association with F.M.F., 2.30 p.m., Borough Polytechnic, London, S.E.1, "Protective Clothing in the Food Industry," discussion.

**R.I.C.,** Friday, November 18: joint meeting with C.U. Chemical Society, University Chemical Laboratory, Cambridge, "Gastronomic Chemistry" by A. McM. Taylor.

*News from Scotland*

## Mechanical development of bread dough

The development of continuous baking processes which, it was stated, would revolutionise the baking industry was described on September 17 by two bakery research workers at a summer course at Bearsden, near Glasgow, on "Recent Advances in Food Science." The two-week course at Chesters House, the residential study centre of the Royal College of Science and Technology, Glasgow, was attended by more than 100 food scientists from all parts of the world.

The speakers on the final day of the course were Mr. J. J. Devlin and Dr. N. Chamberlain, senior research workers with the British Baking Industries Research Association.

Dough had been mixed in a batch process for centuries, said Mr. Devlin, and although travelling ovens had been introduced to replace the old peel ovens, it was only now that a continuous mixer, similar to those used in industries such as the plastics industry, had been produced which would make the baking of bread continuous.

Allied to the continuous mixer was the mechanical development of bread doughs, which meant the complete abolition of dough fermentation. This was a far more revolutionary innovation, said Dr. Chamberlain.

In the conventional bread-making process the bulk fermentation stage fulfilled several functions over a period of three to four hours. By the application of intense mechanical action the change in rheological properties could now be made to occur in a space of three minutes, he added.

The other effects of bulk fermentation were achieved by combining the ingredients, with or without a part of the flour, into a brew which was fermented before adding it to the flow immediately before mixing and mechanical development.

Not every type of flour produced good bread by this radical new process, said Dr. Chamberlain. Experiments at the association's research centre at Chorleywood, Herts., had shown that some flours required the addition of a fast-acting oxidising flour improver such as potassium iodate to ensure good results.

The end product was a loaf with a smooth biscuit-like crust and a very fine, almost cake-like, crumb structure. In reply to questions Dr. Chamberlain said that the new loaf had as high a nutritional value as the conventional loaf and, probably because of the finer distribution of fat through the loaf, it seemed to keep better.

Dr. Chamberlain said that flavour was one of the most difficult problems in bread-making. He felt that there was plenty of scope for the development of flavour in the new loaf.

# OVERSEAS NEWS

## World food production gaining on population growth—*says F.A.O.*

F.A.O.'s annual report, *the State of Food and Agriculture*, 1960, says that stocks of wheat, rice and coarse grains are at their highest ever.

" Total grain stocks in the major exporting countries,* including normal carryovers, now amount to the unprecedented figure of 126 million tons." This is " almost four times as much as in 1952," roughly when the post-war accumulation of stocks began.

At the present total, these stocks represented about 40% of the current world production of wheat and 25% of coarse grains, excluding the U.S.S.R., Eastern Europe and mainland China.

In terms of commercial exports, F.A.O. said, " the stocks would cover almost two years of world wheat exports and almost four years of exports of coarse grains . . ."

The report says that preliminary estimates for 1959/60 show a rise in world agricultural production of about 2% over the previous year, slightly exceeding the annual population growth of 1.6%. Biggest increases were in western Europe (4%) and the Far East, excluding mainland China (over 3%). The only decline was in Africa (1%). In highly developed countries the increase came largely through higher yields, and in the less developed through increased acreage.

Other highlights of the report: the centre of gravity of the world food problem remains the Far East—at least 11 m. more to feed every year (excluding mainland China); the gap between food supplies in the more and less-developed regions has tended to widen rather than narrow in recent years.

* *Major exporting countries:*

*wheat—U.S., Canada, Argentine and Australia; rice—U.S., and Asian exporters, e.g., Burma and Thailand; coarse grains—U.S. and Canada.*

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### Suspect Dutch margarine

According to *The Times*, Dr. van Rooy, Dutch Minister of Public Health, answering questions in the second Chamber of the States General today, maintained that the health authorities had not failed to act correctly over the skin disease caused by Planta margarine, manufactured by Van den Berghs and Jurgens, a subsidiary of Unilever.

As far back as the middle of last year, he said, the State Institute for Public Health, at the request of Van den Berghs and Jurgens, had analysed the new brand, and by the time it was put on the market the investigation was not complete.

In August this year, when the suspicion first arose that there was a connection between the skin disease and the new brand, production was stopped and the margarine returned by retailers. Three days later state analysts were told during a visit to the Unilever laboratory at Vlaardingen that the emulsifier manufactured at the Unilever laboratory at Bährenfeld, near Hamburg, was thought to be the cause of the trouble.

The matter is at present under investigation by three separate commissions.

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### Dutch baby food company formed

Special baby and infant foods are to be manufactured in Holland by a newly formed subsidiary of a leading U.S. concern in this field, M. and R. Dietetic Laboratories of Columbus, Ohio. The Dutch company, M. and R. Laboratoria N.V., has acquired a factory site near the county town of Zwolle, east of the Zuyderzee. Of its Fl.1 m. (£94,300) nominal capital, 20% has been placed and fully paid up. All the issued shares but one are in the hands of the U.S. parent concern.

The company, while entitled under its articles of association to manufacture, process and market any food, including ice cream, will concentrate on the special foods. Sales will be aimed at Holland and other Continental countries.—*Financial Times.*

### South African canned fruit sales in U.K.

For the half-year ended April 30, 3,290,000 cases of South African canned fruit were sold in Britain as compared to 2,696,000 cases for the whole of the 1959 canning year.

A canning industry spokesman said that imports of canned fruits from the Union for the first six months of 1960 totalled 1,072,000 cwt. — about 2,680,000 cases—as against 607,000 cwt.—about 1,517,500 cases—for the first half of 1959.

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### Sugar fluctuations

From Mauritius, Barclays Bank D.C.O. reports that local opinion is that the sugar crop will show a large reduction. It is generally estimated that the crop will not exceed 275,000 metric tons compared with over 579,000 metric tons last year.

Up to August 18, 12,389 tons of sugar were shipped, all of which went to the United Kingdom. This figure compares with 43,224 tons for the corresponding period last year, of which 36,423 tons were shipped to Canada.

An increase in sugar production is, however, reported by the Bank from British Guiana. By the third week in August all the sugar factories had commenced grinding and production up to this time was 146,880 tons, an increase of 23,060 tons compared with the corresponding period in 1959.

The Bank adds that as a result of the United States reducing their quota of Cuban sugar by 700,000 tons and reallocating this to other sugar producing countries, a quota of 82,826 tons has been allocated to the West Indies and British Guiana, of which the British Guiana share is 30,694 tons.

*This Platz "Baby" sprayer was seen recently by the Editor in use at the Wine Research Station's experimental vineyards at Asti, Italy. It imparts an electric charge to the spray particles, causing them to adhere to both sides of the leaves. The spray is a copper salt with talcum and a proprietary compound called "Zineb."*

### Less coffee from East Africa

Kenya, Uganda and Tanganyika will export 2,380,000 bags (of 60 kg.) for the year beginning October 1, under the International Coffee Agreement signed in Washington on September 26. This is 200,000 bags less than the first estimate of exportable production. If the estimate is revised upwards in March, 1961, the quota will be increased by the same amount.

### £3½ m. Rhodesian sugar project

From Southern Rhodesia, Barclays Bank D.C.O. reports it is anticipated that £3½ m. will be spent during the next two years by Triangle, Ltd., on a new mill capable of handling 75,000 tons of sugar a year, and on clearing and preparing 12,000 acres of land additional to the nearly 6,000 acres at present under cultivation on the company's sugar estates at Triangle.

### Higher milk yield in Australia

Australian production of milk this year is expected to reach a total of 1,396 million gallons, slightly less than the all-time record, the Bureau of Agricultural Economics reports in a review of the dairy situation.

The Bureau attributes the high production figure to higher yield per cow, largely due to favourable seasonal conditions throughout most of the year.

Most of the increased milk supplies will be used for butter production, which should rise by some 2% to 195,000 tons. Cheese output may rise by 1,000 tons to about 44,000 tons, and greater use for condensed products is expected.

### New vegetable oil factory in Dominican Republic

A complete new unit capable of processing 28,000 gal. of groundnut oil daily has been installed by Sociedad Industrial Dominicana. Previously the daily capacity was 12,000 gal. The total cost of new machinery and factory buildings was £300,000. Sharples Corporation and the Girdler Company supplied all equipment.

Groundnut cultivation in newly reclaimed areas of the Republic produces annual crops valued at over $10 million. The new industry supports 25,000 families.

### U.S. freeze-dried food firm taken over

The United Fruit Co., grower and shipper of bananas from Latin America, is entering the processed foods business in the U.S.A. The initial step was the acquisition during August of Liana Inc., San Carlos, Texas, a company presently engaged in the freeze dehydration of shrimp.

The Liana corporation is the first commercial freeze-dry food operation in the U.S.A. Its operation so far has been confined to shrimp, but extension of the technology to other products, including seafoods, fruit and vegetables and various formulated foods including sauces, is envisaged.

### Ethiopian canned meat exports up 150%

This year Ethiopia will export some 8,000,000 kg. of canned meat, over 150% more than it exported in 1958. At the same time the country has restarted exporting live animals.

Ethiopia is reviving in a rapid manner its export of meat and livestock, according to Dr. Konrad Bänziger, an F.A.O. marketing expert.

"Ethiopia is rich in cattle," said Dr. Bänziger. "While there has never been any census of livestock in the country, as in many other less-developed countries, the number of cattle is estimated to be at least 20,000,000. In addition there are about the same number of sheep and some 17,000,000 goats."

### New milk products factory in Trinidad

Work has recently commenced in Trinidad on the preparation of a 24-acre site for a new factory for the processing of dairy products. The plant, which will cost W.I. $2 m., will be operated by Trinidad Food Products, Ltd., a subsidiary of Nestlés of Switzerland, and will start producing in August, 1961.

### Israel buys S.A. fish

The Cape (South Africa) trawler industry has secured a large order for frozen fish from Israel. The cargo—325 tons—will be carried to that country in the Norwegian freighter *Ice Flower*, and it is hoped this order will lead to the establishment of a profitable export market with Israel.

**"Gentlemen, I propose that we accept the United Sardine Canners' offer of a merger."**

### Notes for Contributors and Authors

The Editor of FOOD MANUFACTURE welcomes articles, news items and other contributions on all aspects of food production.

The purpose of this journal is to exchange information between all those concerned in the food industry. Articles should therefore be written in a readable style, avoiding esoteric terminology and technical jargon, and should contain factual and practical information.

A preliminary synopsis should, preferably, be sent to the Editor, and the contribution itself should be typed in double spacing on one side of the paper only. It should bear the name and address of the author and should be accompanied by photographs suitable for illustrations.

### £3 million cyclone damage to sugar installations

The cost of rehabilitation of sugar factories and plant affected by the two recent cyclones which hit Mauritius is estimated to be over £3,000,000, says Barclays Bank D.C.O. in a report from the island. While it is too early yet to make an accurate assessment, preliminary surveys tend to show that damage to the growing crop will result in a reduction in production of between 40 and 50%.

### New N. Rhodesian sugar refinery

A £1 million sugar refinery has been opened at Ndola, Northern Rhodesia, and immediately started manufacturing over 60 tons a day. It employs 34 Europeans and 240 Africans, and its initial output will be 20,000 tons of refined sugar per annum. It will, however, be eventually able to produce 30,000 tons, and extensions will enable that output to be doubled.

### Ghana meat canning factory

The Ghana Agricultural Development Corporation is reported by Barclays Bank D.C.O. to be planning to establish a meat-canning factory at Bolgatanga, Northern Ghana. The factory will can beef and also transport fresh meat to the south. Quarantine stations will be opened in the area where cattle brought across the border can be kept for observation before they are transported to the factory at Bolgatanga.

# Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

846,270. UNILEVER, LTD.: Container-filling machines.
846,551. ROSE BROS. (GAINSBOROUGH), LTD.: Packaging of liquids.
846,391. FOOD MACHINERY AND CHEMICAL CORPORATION: Conduit system for conveying fluids.
846,474. R. RAFFAETA: Decolorisation and purification of oils and fats.
846,312. CANDY FILTER CO., LTD.: Pumping mechanism for feeding proportionate quantities of liquid additive into a main body of liquid.
846,806. L. H. WILSON: Apparatus for use in baking bread, cake and like.
846,199. KEYES FIBRE CO.: Moulded pulp carton.
846,440. MARYLAND BAKING CO.: Edible cups for ice cream and like confectionery.
847,485. FARBENFABRIKEN BAYER, A.G.: Process and apparatus for demixing substances.
847,115. POMONA FOUNDRY, INC.: Box stacking mechanism.
847,263. ADHESIVE TAPES, LTD.: Bag neck sealing machines.
847,538. DISTILLERS CO., LTD.: Continuous yeast production process.
847,294. W. BAHLSEN: Process for the manufacture of baked products or the like containing fatty fillings or dressings.
847,180. AASTED, K.C.S.: Mould holders for chocolate moulding plants.
847,340. DEUTSCHE MAIZENA WERKE G.M.B.H.: Manufacture of chocolate.
848,328. IMPERIAL CHEMICAL INDUSTRIES, LTD.: Salt crystals.
847,657. PETROLITE CORPORATION: Process for preventing corrosion, corrosion inhibitors and certain mixtures containing cyclic amidines.
848,014. UNILEVER, LTD.: Cured pig meat products.
848,109. L. C. SNELLING (LONDON), LTD.: Marking machines for cans and other containers.
847,669. CORN PRODUCTS CO.: Starch products and processes for making same.
848,356. GENERAL UTILITY CO., LTD.: Ice cream freezing machines.
847,695. H. GAMBLE: Apparatus for applying adhesive to carton blanks.
848,139. E. MORETTI: Package for substances in liquid, paste or powder form and method of manufacturing same.
847,731. BAKER PERKINS, LTD.: Method and apparatus for blending flour or other pulverulent material.
848,176. H. SCHARFEN: Machine for slicing foodstuffs.
848,046. S. J. POPEIL: Food cutters.
848,543. FISADCO, LTD.: Mechanical dressing of fish.
849,108. F. GROSSMAN and R. E. O'BRIEN: Manufacture of mahew and like glucose and lactic acid containing beverages.
848,938. C. VAN DER LELY N.V.: Implement for harvesting beets or like root vegetables.
849,170. BRITISH OXYGEN CO., LTD.: Treatment of perishable foodstuffs.
849,144. R. C. JAHN: Chocolate enrobing machines.
848,801. BOWDEN REPAIRS, LTD. (trading as EUREKA ENGINEERING CO.): Machines for removing skins of sausage or the like.
849,296. U.D. ENGINEERING CO., LTD.: Cleaning systems for machines for filling bottles or other containers with liquids.
848,653. I. PASTORELLO: Continuous drawing, extruding, kneading or mixing machines.
848,680. GIMELLI AND CO. A.G.: Device for making shaped pieces from baking dough or other pasty masses.
850,371. GENERAL FOODS CORPORATION: Pudding compositions.
850,377. W. L. MORRISON: Chilling of foodstuffs and the like.
850,384. THIRODE AND CIE: Cooking vessel for the moulding and cooking of meats.
850,752. CERTUS MASCHINENBAU G.M.B.H.: Bottle gripping devices.
850,635. G. R. WEBER: Method for the artificial ripening of freshly prepared beer.
850,348. TIPPER TIE PRODUCTS OF N.J. INC.: Apparatus for fastening a casing such as a sausage casing with staple-like fasteners.
850,270. ALEXANDERWERK A.G.: Sausage machines.
851,599. BAKER PERKINS, LTD.: Devices for arranging or marshalling dough pieces in or for the manufacture of bread or like products.
851,601. BENCKISER G.M.B.H. Chemische Fabrik, J.A.: Utilisation of molasses spent wash.
852,007. SVENSKA SOCKERFABRIKS A.B.: Method and apparatus for making moulded cubes of sugar crystals.
851,396. KYOWA HAKKO KOGYO KABUSHIKI KAISHA: Method of producing L-Lysine by fermentation.
851,839. GENERAL FOODS CORPORATION: Potato product.
851,470. HESSER, MASCHINENFABRIK A.G., F.: Apparatus in filling and closing machines for evacuating and gas-treating packages.
852,053. GRIFFITH LABORATORIES, INC.: Process of preparing a uniformly palatable soybean protein concentrate.
852,559. GENERAL FOODS CORPORATION: Artificial chocolate flavour base for confectionery products and method of producing same.
852,564. COOLMOTA, LTD., F. E. OWEN and F. L. MILLER: Apparatus for processing foodstuffs.
852,602. LIPTON PRODUCTS, LTD.: Liquid-level indicators.
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852,175. O. S. JONSSON: Method of treating slaughtered animals, and a device for performing the method.
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852,444. ELECTROLUX, LTD.: Absorption refrigerating apparatus.
852,090. H. AND C. CONTAINER MACHINERY CORPORATION: Container flap-cutting machine.
852,220. JURO ELECTRO APPARATUS WORKS L. HENZIROHS, LTD.: Juice extractors.

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***Technical Press Review***

## Corrosion and the Food Manufacturer

Corrosion is an ever-present problem in the food industries, where contamination of food by products of corrosion can be more serious than inefficiency of processing machinery due to corrosion. Either way, answers to most of these problems can be found at the Corrosion and Metal Finishing Exhibition held at Olympia from November 29 to December 2.

Our associate journal, **Corrosion Technology**, the organiser of the Exhibition, this month includes an extensive preview of the Exhibition, which will give a full picture of its extent and content as it will concern the food manufacturer.

The current issue of **Fibres and Plastics** contains a special review of synthetic fibre developments. Also included are articles on "Processing High-density Polythene" and "Sprayed Fibre Reinforced Plastics."

This month's issue of **Manufacturing Chemist** includes a special feature on Grinding and Grinding Machines, as well as contributions on "Carbohydrates in the Chemical Industry" and "Honey in Pharmaceuticals."

**Petroleum** features articles on the "Growth of the German Refining Industry," "Water in the Petroleum Industry" and "Reforming Natural Gas."

Instrumentation for Process Control is the special feature in **Chemical and Process Engineering**, which also contains articles on "Process Dynamics in Process Control," "Instrumentation and Control of a Pilot Plant" and "Instrumentation and Control of a Distillation Plant for Chlorosilanes."

**World Crops** is devoted to a special review of silage.

Articles of special interest in **Dairy Engineering** are "Psychrophilic Bacteria in Pastuerised Milk," "How to Tackle Effluent Disposal Problems" and "Water Treatment for Steam Production."

**Paint Manufacture** contains part 2 of an article on "Carbon Black Dispersions," and contributions on "Developments in Paint Viscometry" and "Advanced Paint Chemistry."

**Automation Progress** includes articles on "Process Control in the Manufacture of Formica," "Industrial Servo Controls" and "From Telemetering to Remote Automatic Control."

# New Companies

**Modern Packages, Ltd.** (665788.) 23, Lawrence Lane, Cheapside, London, E.C.2. To carry on the bus. of mnfrs. and vendors of tin boxes and of containers, etc. £100. Dirs.: Charles Karen and John Wilson.

**Parc Tendabird, Ltd.** (665794.) Parc-y-Justice, Llandilterne, Glam. To take over the bus. of poultry packing station carried on at Parc-y-Justice, Llanilterne, Glam., etc. £10,000. Dirs.: Eric Wood, Howard R. Jackson, John T. Nicholl, Maurice S. Williams and Clifford A. Wills.

**Kingan and Co., Ltd.** (665808.) To carry on bus. of preparers, canners, preservers and curers of foodstuffs of all kinds, etc. £100. Subs.: David N. Tate (solr.) and D. W. H. Farmer (clk.).

**Norfcan, Ltd.** (665056.) To carry on bus. of genl. and mnfrs. agents, producers, mnfrs. of and dlrs. in canned goods, etc. £100. Subs.: Jean Herbert (co. dir.) and Thos. A. Herbert (barrister).

**T. E. Gallacher and Sons, Ltd.** (666047.) Earl Street, Ince-in-Makerfield, near Wigan. To carry on the bus. of mnfrs. of and dlrs. in pickles, sauces, etc. £5,000.

**Markham and Sons (Maldon), Ltd.** (666080.) To mnfre. and deal in beverages and food of all kinds, etc. £100. Subs.: Reginald C. Berfield and Alan Peterson.

**Frederick Tyrrell and Co., Ltd.** (666128.) Trelco Works, Dawes Street, Bolton. To carry on bus. of mnfrs. of and dlrs. in chemicals and animal feedingstuffs, etc. £1,000. Dirs.: Fredk. Tyrrell and Fred Higson.

**Southern Soft Ice Cream, Ltd.** (666321.) 11a, Southgate Street, Winchester. £100. Dirs.: Stanley A. Buchan, Edwin J. Maynard and Geoffrey D. Goodwin.

**Charles Hennings (Vintners), Ltd.** (666499.) London House, Lower Street, Pulborough. To carry on the bus. of genl. store-keeper, mnfrs. of and dlrs. in beer, wines, etc. £500. Dirs.: Charles T. Hennings and Rose Hennings.

**Pegasus Supplies (Packaging), Ltd.** (667283.) 19, Pelham Road, Sherwood Rise, Nottingham. To carry on bus. of mnfrs. of and dlrs. in packaging materials, etc. £500. Dirs.: Ronald S. Swain, Bolesaw Drozdzal and Rose H. Page.

**Rakusen (Kosher) Frozen Foods, Ltd.** (667287.) £1,000. Dirs.: Emmanuel Rakusen and Philip Rakusen.

**Bamber (Manchester), Ltd.** (667323.) 33-35, Yorkshire Street, Oldham. To carry on bus. of wine and spirit mchts., coopers, bottlers, distillers, etc. £100. Dirs.: Malcolm F. Bamford and Lionel D. Harrison.

**Leepak (Langford), Ltd.** (667492.) "Hollycroft," 26, Church Street, Langford, Beds. To carry on bus. of prepackers, packers, canners, tinners, bottlers, processors of and dlrs. in potatoes, vegetables, fruit, etc. £3,000. Dirs.: Fredk. W. Larman, Rupert J. Lee, Ivy A. Larman and Bert R. Bryant.

**Church's (Epping Sausages), Ltd.** (667520.) 196, High Street, Epping, Essex. £100. Dirs.: Mary C. Church and Gordon A. Church, and May A. Church.

**Ruth Bernard, Ltd.** (667668.) 987, High Road, London, N.12. To carry on bus. of mnfrs. of and dlrs. in confectionery, chocolates, etc. £100. Dirs.: Bernard J. West and Ruth C. West.

**Wombourne Prepackers, Ltd.** (667858.) To carry on bus. of pre-packers, packers, canners and bottlers of fruit, vegetables, etc. Dirs.: to be apptd. by subs. Subs.: W. P. Lockstone and W. L. Cockerill.

**Wimborne Chocolate Co., Ltd.** (668027.) 14, Wimborne Road, Nottingham. To carry on the bus. of mnfrs. of and dlrs. in chocolate, etc. £2,000. Dirs.: Ernest Davies, Frank M. J. Yexley and Dennis Glover.

**Waveney Valley Packers (Diss), Ltd.** (668128.) Bungay Road, Harleston, Norfolk. To carry on bus. of poultry and egg packers, etc. £20,000. Dirs.: Lennox D. Holl and Desmond Holl.

**Kuwala Tea Co., Ltd.** (668004.) 19, Baldry Gardens, Streatham, London, S.W.16. £100. Dirs.: Edward W. Kearnon and Maureen R. Kearnon, and Jeffrey A. T. Birch.

**Gaimsters (1960), Ltd.** 668180.) To carry on bus. of provision merchants, yeast importers, egg merchants, sugar refiners, etc. £40,000. Dirs.: Wilfred C. Gaimster and Tom Gaimster.

**Flash-Frozen Food Products, Ltd.** (668281.) 40, Upper Berkeley Street, London, W.1. £100. Dirs.: David Givert, Jackson Smith, Jack Myer Green and Mildred M. Givert.

**Pershore Poultry Packing Station, Ltd.** (668334.) £5,000. Dirs.: not named. Subs.: Rosamund W. Simmons and Ethel E. James.

**Wensleydale Holdings, Ltd.** (668636.) 6, Victoria Road, Darlington, Co. Durham. To carry on bus. of cheese mnfrs., dairy produce dlrs., etc. £100. Dirs.: Thomas Craggs and Mrs. Thora Craggs.

**A.F.D., Ltd.** (668640.) 72, Red Lion Street, London, W.C.1. To carry on bus. of mnfrs. of and dlrs. in dehydrated products, etc. £10,000. Dirs.: Edward Hack, Thelma Wander and Joyce Bell.

**Minx (Melton Mowbray), Ltd.** (668760.) Barclays Bank Building, Hamilton Road, Slough. To carry on bus. of mnfrs. of and dlrs. in animal food, etc. £100. Dirs.: Cyril F. Windrow and Ernest L. Halliwell.

*These particulars of new companies recently registered have been extracted from the daily register of Jordan and Sons, Ltd., Company Registration Agents, 116, Chancery Lane, London, W.C.2.*

# Trade Marks

**PETER PAN.**—802,468. Pickles. **Maconochie Brothers, Ltd.,** Maconochie House, 140-142, Great Portland Street, London, W.1.

**SUNNY ORCHARD.**—803,226. Jams, jellies (for food), marmalade, lemon curd, mincemeat and canned fruits. **Penberthy and Sanders, Ltd.,** 250-256, Tiverton Road, Bournbrook, Birmingham, 29.

**BECEL.**—804,335. All goods included in Class 29. **Van den Berghs and Jurgens, Ltd.,** Unilever House, Blackfriars, London, E.C.4.

**THINABICS.**—B796,040. Biscuits (other than biscuits for animals). **Meredith and Drew, Ltd.,** Murray House, Barbican, London, E.C.1.

**PANTOMIME.**—801,297. Boiled sugar confectionery; and chocolates. **Robertson and Woodcock, Ltd.,** Trebor House, Woodford Green, Essex.

**PETER PAN.**—802,469. Sauces. **Maconochie Brothers, Ltd.,** Maconochie House, 140-142, Great Portland Street, London, W.1. To be associated with No. 802,468.

**SUNTEX.**—802,767. Bread and flour confectionery. **Browns' (Mansfield), Ltd.,** 169, Chesterfield Road South, Mansfield, Nottinghamshire.

**QUALITY STREET.**—803,240. All goods included in Class 30. **John Mackintosh and Sons, Ltd.,** Albion Mills, Halifax, Yorkshire. To be associated with No. 562,327 (3000, 1204) and others.

**TEDDY.**—803,767. Honey. **The Bear Honey Co., Ltd.,** Garvin House, Twickenham Road, Isleworth, Middlesex.

**RED DOT.**—B798,718. Potato chips; and potatoes cut into strips and cooked by frying in deep fat. **Red Dot Foods, Inc.,** 1435, East Washington Avenue, Madison 3, Wisconsin, U.S.A.

**PRIMULA.**—783,333. All goods included in Class 29, but not including fruit or vegetables or any goods of the same description as fruit or vegetables. **O. Kavli A/S,** Damsgardsveien 59, Bergen, Norway.

**SPO.**—788,539. Canned fruits. **Shepparton Preserving Co., Ltd.,** 5-7, Archer Street, Shepparton, Victoria, Australia.

**MOOCHIL.**—791,659. Processed milk and flavoured milk included in Class 29. **Marmaduke Carver Middleton Athorpe,** Laplovd Barton, Bridford, Exeter.

**BETTY MARTIN.**—B794,892. Canned fruit and canned vegetables, all for sale in Warwickshire, Worcestershire, Staffordshire, Cheshire, Gloucestershire, Herefordshire, Shropshire, Derbyshire, Radnorshire and Montgomeryshire. **Warriner and Mason, Ltd.,** Reginald Road, Smethwick, Birmingham, 41.

**BOY - AR - DEE.**—798,941. Meat and meat extracts: fish, poultry and game (none being live); cheese; fruits and vegetables all being preserved, dried or cooked; jellies (for food, jams; fruit preserves and vegetable preserves; milk, eggs, edible oils and edible fats; and pickles. **American Home Products Corporation,** 22, East 40th Street, New York, N.Y., U.S.A.

**CRESCENT.**—801,516. Canned fish. **Robinson Canning Co., Inc.,** 1720, Broadway Street, New Orleans, 18, Louisiana, U.S.A.

*New patents are from the Journal of Patents and new trade marks are from the Trade Marks Journal. In each case permission to publish has been given by the Controller of Her Majesty's Stationery Office. Each of the publications is obtainable from the Patents Office, 25, Southampton Buildings, London, W.C.2.*

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**3 Shelf Testing.** The sales appeal of a new pack can be tested in self-service or other stores and the speed and volume of offtake audited and analysed by type of shop and locality. The pack may be tested either alone or against any alternative.

**4 Area Test Marketing.** Facilities are available for area test marketing any new product. An expertly staffed marketing service has been established which will plan, organise and, if desired, execute test marketing campaigns in their entirety for Packers launching new glass packed products.

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**Security.** Where any of these tests are carried out on new products, the whole operation can be executed with absolute security. Packers can have complete anonymity by employing one of the several brand names that have been registered especially for this purpose.

*If you would care to have further details of this service, please do not hesitate to ask, irrespective of whether your interest is immediate or not. Details of this scheme have been published as a booklet, copies of which are available on request from your Glass Manufacturer or from the Federation.*

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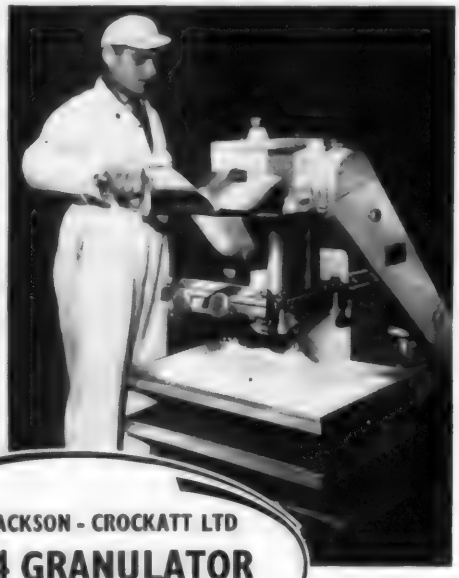

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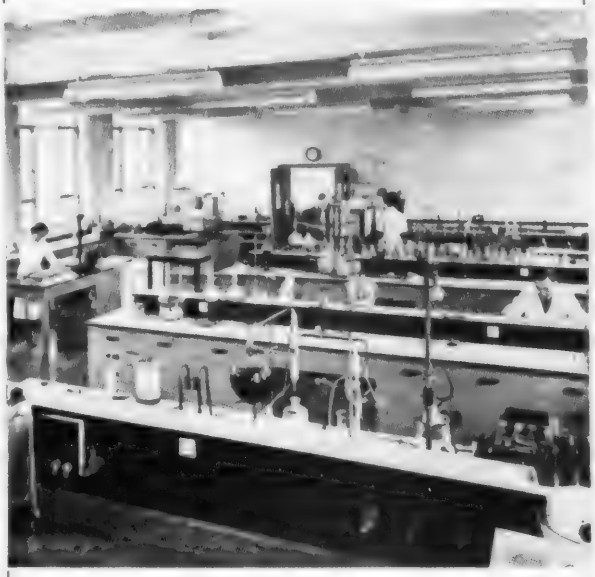

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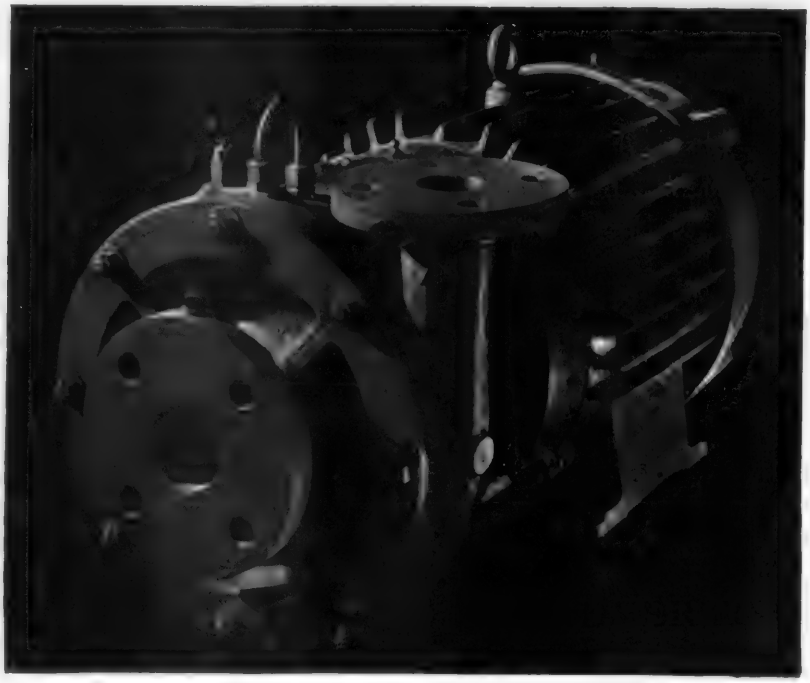

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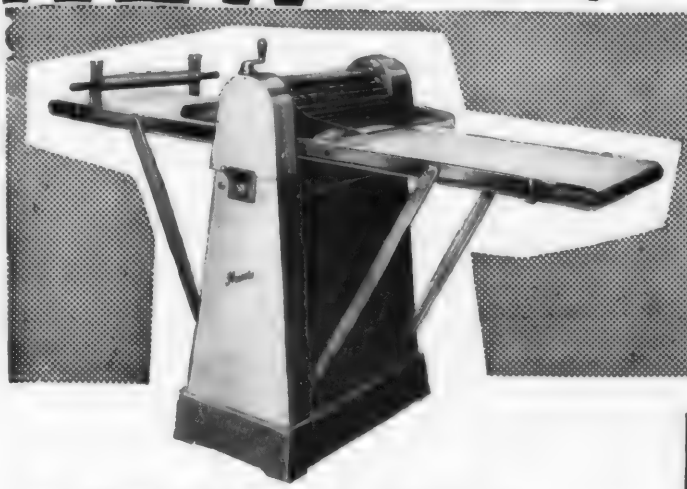

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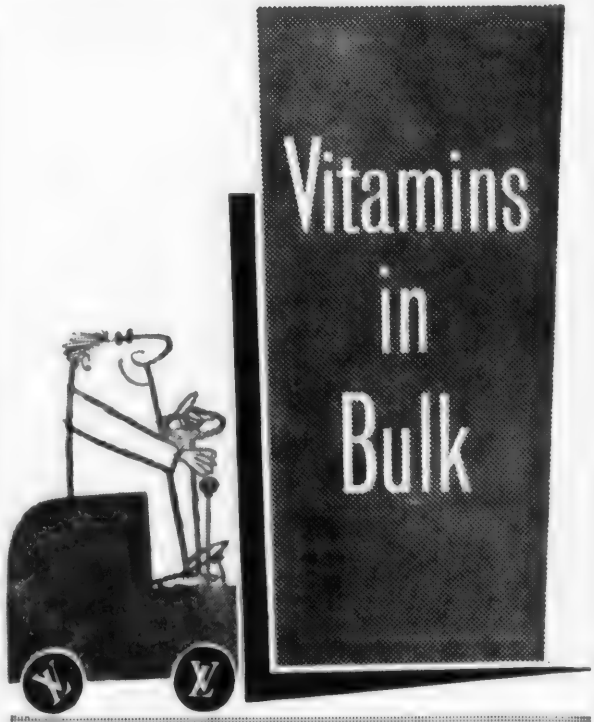


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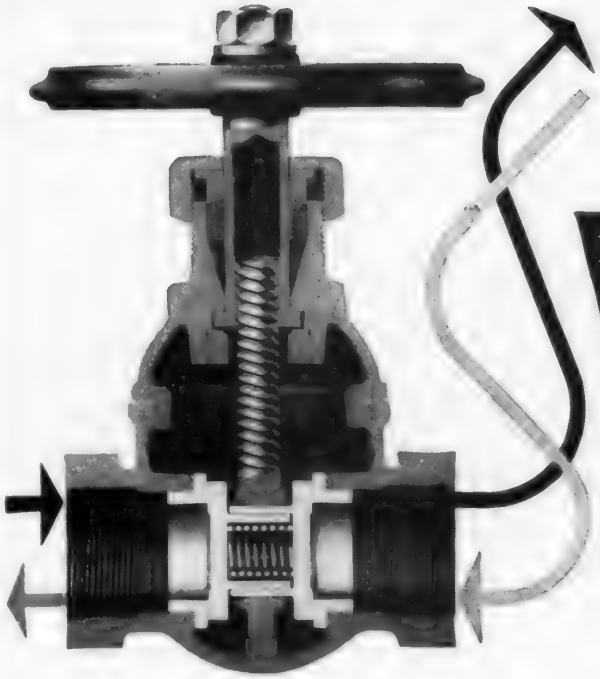

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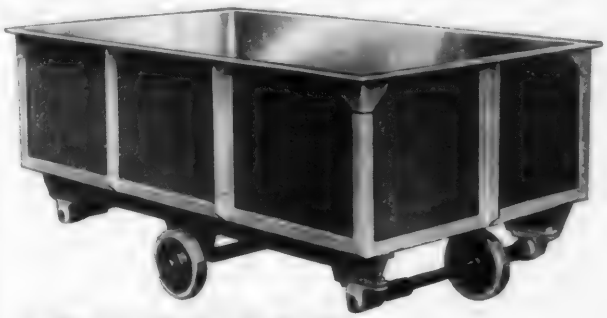

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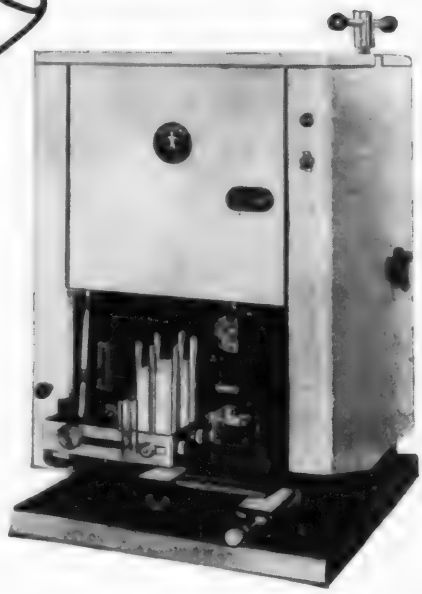

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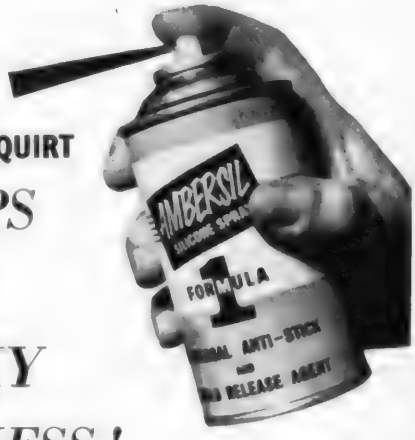


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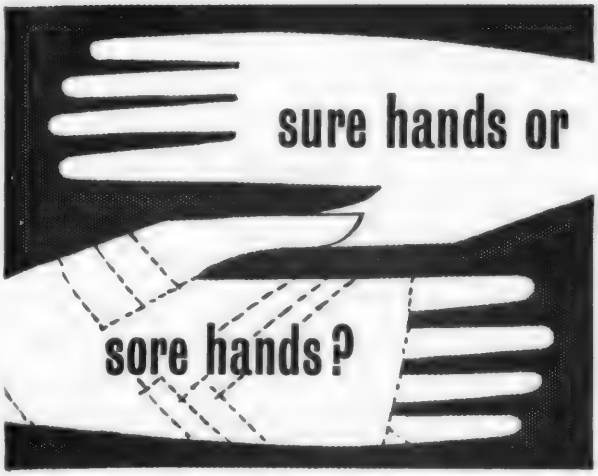


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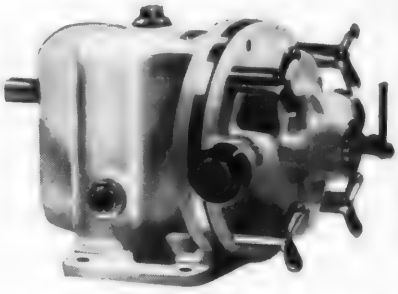

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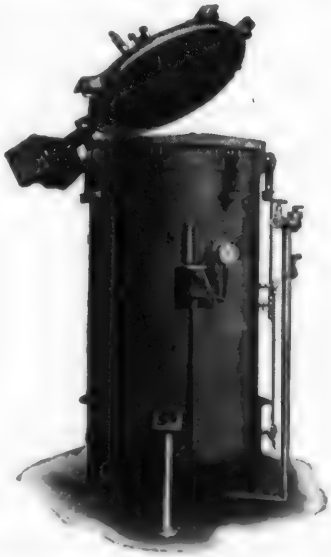

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# I.S.I.S. Appointments Register

*Licensed annually by the L.C.C.*

9, Eden Street, London, N.W.1. EUSton 5911.

I.S.I.S. is an organisation backed by a large industrial group of consultants with contacts in all the industries based on technology. As an addition to their present resources they have established this Appointments Register. Below will be found some of those technologists who are looking for further opportunities. Employers and Personnel Officers are invited to complete the form below, detach and send to the above address. In this particular instance the use of a form, with its attendant simplification of office systems, ensures speedier results for the employer.

**Ref. A.673.** Indian. Male. Married. Age 29. **RESIDENT CANADA.** B.Chem.Eng. 3 years Chemical Engineer with Design experience, atomic energy establishment. Seeks **TECHNICAL SALES APPOINTMENT IN CHEMICAL ENGINEERING.** London or Canada. £1,000 p.a.

**Ref. A.674.** British. Male. Married. Age 38. O.N.C. and H.N.C. Elec. Eng., A.M.Inst.Elec.Engrs. 5 years Engineering Apprenticeship. 1 year Tester and 2 years Technical Assistant, electrical plant manufacturers. 1 year Electrical Engineer, chemical plant manufacturer. 4 years Manager and Director, electrical contractor. 5 years Electrical Engineer, chemical and food manufacturer. At present Senior Sales Electrical Engineer, electrical plant manufacturer. Seeks appointment as **SALES MANAGER DIRECTOR, TECHNICAL MANAGER DIRECTOR OR CONSULTANT.** London or S. England. Salary £2,500 p.a.

**Ref. A.675.** British. Male. Single. Age 27. H.N.C. (Mech.). 6 years Apprentice, ship repairs. 3 years Instrument Fitter, R.A.F. 2 years Engineering Assistant, thermionic valve manufacturer. At present Draughtsman, thermionic valve manufacturer. Seeks post as **DRAUGHTSMAN OR ENGINEER.** London. £1,000 p.a.

**Ref. A.676.** Pakistani. Single. Age 28. **RESIDENT U.K.** B.Sc. Elec. Engg. 5 years Assistant Engineer (Electrical and Mechanical), test and repair of electrical and mechanical machinery. Seeks post as **ELECTRICAL ENGINEER.** U.K., U.S.A., Australia, New Zealand, Canada, W. Germany, France, or Middle East. £60 per month.

**Ref. A.679.** British. Male. Married. Age 51. B.Sc. (Eng.), A.M.I.Mech.E., M.I.G.E. 2 years Apprentice, electrical power, steam and l.c. prime movers. 3 years Pupil/Draughtsman, ironfounders, steel fabrication and welding, heavy chemical plant. 1 year Junior Engineer, materials handling, oil tank. 2 years Constructional Engineer, excavation and sea work, pipe laying. 9 years Assistant Engineer, gas, by-product and heavy chemical plant. 10 years Design and Development Engineer, heavy chemical manufacturer. At present Chemical Engineer (Sales Development), heavy chemical manufacturer. Seeks **SENIOR PROJECT, DESIGN OR DEVELOPMENT POST** in chemical or allied fields or with consulting engineers. £1,900 p.a. min.

**Ref. A.680.** German. Male. Married. Age 46. Diploma in Mechanics and Prod. Engg. and qualifications in Design and Prod. Management. 3 years Design Engineer, steel plant and fabrication. 4 years Fabrication Engineer, steel products. 3½ years Design Engineer (petrochemicals), chemical process layout. 5 years Fabrication Engineer, chemical process installations. 2 years Design Engineer, power plant installations. 4 years Contract Engineer, power plant and transmission. At present employed in European H.Q. of U.S. Consulting Engineering concern on liaison and inspection for complete power plant contracts in German works. Has experience in materials testing, welding certificate, practice in all machining and assembly operations, construction site supervision, billing and quotations. Languages: English, French, Portuguese and German. Seeks appointment as **SENIOR ENGINEER (MECH. OR DESIGN)**, any location considered. £2,000 p.a. approx.

**Ref. A.681.** Indian. Male. Single. Age 27. **RESIDENT U.K.** B.Sc. (Maths., Physics), B.Sc. (Mech. Eng.) (London). Experience includes 1 year Drawing Office Assistant, vegetable oil manufacturers. 3 months Centrifugal m/c operator. At present Graduate Trainee, electricity generation. Seeks **SALES ENGINEERING OR MANAGEMENT POST**, Far East, Middle East, Italy, U.S.A.

**Ref. A.683.** British. Male. Married. Age 29. B.A. (Sociology), M.A. 2 years Research Assistant, university. At present Senior Commercial Programmer, computer manufacturer. Member of working party on common source languages of electronic engineering association, responsible for development and application of business programming languages. Seeks appointment in Canada as **SENIOR PROGRAMMER.** Salary 8,400 Canadian dollars p.a.

**Ref. A.684.** British. Male. Single. Age 33. B.A. and M.A. (Oxon), in Engg. Science, A.M.I.C.E. At present Civil Engineer on design and contract administration with consulting civil engineers. Experience of survey work and site supervision and design and construction in reinforced concrete, structural steelwork and tunnels in soft ground. Seeks appointment as **CIVIL ENGINEER** in office or on works with Consulting Engineer or Contractor. Any area considered. Salary in U.K. £2,000 p.a.

**Ref. A.685.** British. Male. Married. Age 28. G.I.Mech.E. 1 year Research and Project Engineer, diesel, boiler and general engineer. 2 years Fuel Oil Supervisor, oil company. At present engaged in Fuel Oil Sales with oil company. Seeks post as **TECHNICAL ASSISTANT TO SALES MANAGER OR DIRECTOR OR AS SALES ENGINEER (TECHNICAL).** London or Essex. £1,500 p.a. min.

**Ref. A.686.** British. Male. Married. Age 36. O.N.C. (Mech. Engg.). 6 years Toolmaker and 9 years Foreman, experimental workshop, with cable and aircraft hose manufacturers. 3 years Experimental Workshop Instrument Maker, instrument and meter manufacturers. At present Toolmaker and Instrument Maker, instrument and meter manufacturers. Seeks post as **EXPERIMENTAL WORKSHOP ENGINEER**, London (N.W.) preferred). £900 p.a. approx.

**Ref. A.687.** British. Male. Married. Age 30. H.N.C. (Chem.) and Diploma in Chem. Engg. 3 years Plant Chemist, detergents and surfactants. 5 years Production Chemist, Assistant Plant Manager, pharmaceuticals, fine chemicals for pharmaceuticals. 6 months Research Plant Consultant, chemical consultants. 1 year Production Manager, alkyl and fine chemicals, surface coatings. At present Production Manager, chemical manufacturers. Experience of standard costing, budgeting, labour selection, customs and excise administration. Seeks appointment as **PRODUCTION OR ASSISTANT WORKS MANAGER**, U.K., London or S. England preferred. £1,400 p.a.

**Ref. A.688.** British. Male. Married. Age 46. Inter B.Sc., A.F.Inst.Pet., A.M.Inst.W.S. 8 years Chemical Analysis, food production. 13 years Works Chemist, coal tar distillation. At present Plant Superintendent, production of catalysts for petroleum industry. Seeks **PRODUCTION MANAGEMENT** appointment. U.K.—S. London or S. England. £1,200 p.a.

**Ref. A.689.** British. Male. Married. Age 44. 1st Class Certificate from technical institute in Commerce, Book-keeping, Geography, M.P.O.A. 5 years Assistant in purchase and stock recording of materials, distillers and exporters. 8½ years Chief Buyer and Material Controller, mechanical and electrical engineers. 2½ years Chief Buyer, medium/heavy engineers and drop forgers. 6 months Chief Buyer, plastic moulders. At present Chief Buyer, mechanical and electrical engineers. Accustomed to handling wide range of purchases to meet mass production of a variety of appliances. Seeks post as **CHIEF BUYER**, London or Home Counties. £1,400 p.a.

**Ref. A.690.** British. Male. Married. Age 43. 1st Class Inter. and Final of N.J.I.C.F.M.I. 2 years Assistant, cereal research laboratories. 6 months, Assistant Mill Manager and 6 months P.A. to Managing Director, flour millers. 9 years Area Manager and 1½ years Sales Manager, milling engineers. 1½ years P.A. to Managing Director, provender millers. At present Milling Consultant.

*(continued overleaf)*

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To: I.S.I.S. Appointments Register, 9, Eden Street, London, N.W.1. Please ask the following applicants to communicate with the undersigned:

| | | | |
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*For each person engaged the equivalent of two weeks salary payable by the employer within fourteen days of the date of engagement.*

Signature ..... Date .....

# I.S.I.S. APPOINTMENTS REGISTER (Continued from previous page)

Seeks appointment involving extensive travel U.K. or abroad, where mature judgement and marked sense of responsibility plus initiative are required. £2,000 p.a. approx.

**Ref. A.691.** British. Male. Married. Age 36. R.S.A. Book-keeping and Accounting. 20 years Clerk/Section Leader, with accounting experience, transport organisation. Wide experience of administration and organisation through civic activities and 15 years experience welfare organisation (voluntary). Seeks post in **OFFICE MANAGEMENT/ADMINISTRATION**, London or S.W. England. £1,000 p.a.

**Ref. A.692.** British. Male. Married. Age 28. H.S.C. Chem., Physics and Maths and now studying for degree in Chemical Engineering. 4 years Shift Chemist, research and development on industrial chemical processes. 3 years Chemist-in-charge, research and development on process for making a cellulose derivative. At present Production Manager for small company manufacturing fine chemicals. Seeks post, possibly in Research or Development, with chemical engineering bias. U.K. £800/£900 p.a.

**Ref. A.694.** British. Male. Married. Age 38. O.N.C. and H.N.C. and Endorsements Mech. Engg., A.M.I.Mech.E. 3½ years Apprentice in Mechanical Engineering in Germany. 1 year Process and Production Engineer and 2 years Draughtsman and Detail Designer working on Mechanical Handling Plant, Jigs, Tools, Fixtures, Linotype Printing Presses and Special Purpose Machinery with German engineering concern. U.K. experience includes 7 years Designer with general mechanical and electrical engineers, responsible for development and design of confectionery machinery, power transmissions, mixing, processing and packaging machinery, storage tanks and pressure vessels, mechanical handling plant and special purpose machines. At present Development Engineer on Executive and Supervisory Staff, manufacturers of chocolate and confectionery. Seeks post as **TECHNICAL REPRESENTATIVE/SALES ENGINEER**, London preferred with opportunity to represent company in Europe. £1,300 p.a.

**Ref. A.695.** Single. Age 24. Studying for B.Sc. Aeronautical Engg, Student member of Royal Aeronautical Society. Has taken course in flight testing. At present Draughtsman, design engineering concern. Seeks post as **ENGINEER**, London. £800 p.a.

**Ref. A.697.** British. Male. Married. Age 53. H.N.C. Elec. and Mech. Engg., M.I.E.E., College apprenticeship with electrical plant makers. 1 year Technical Sales Engineer, manufacturers electrical plant and pumps. 5 years Army Service, Captain operating electrical repair workshops. 10 years Technical Sales Engineer, manufacturing electrical engineers. 6 years Buyer and Technical Adviser, exporting and engineering concern. 6½ years Manager Machinery Export Department, exporter and merchant shipper, and Director of subsidiary moulded rubber manufacturing concern. Seeks **TECHNICAL SALES OR EXPORT MANAGEMENT APPOINTMENT**. London preferred. £2,000 p.a.

**Ref. A.698.** British. Male. Married. Age 30. Master Mariner's Foreign Going Certificate. 14 years Cadet/3rd/2nd/1st Officer, shipowners. At present First Navigating Officer, oil tankers. Seeks post preferably as **MARINE REPRESENTATIVE FOR COMPANY MANUFACTURING MARINE EQUIPMENT OR AS CARGO SURVEYOR**, but will consider any offers. Preferably London but will go anywhere. £1,200 p.a.

**Ref. A.699.** British. Male. Married. Age 33. B.Sc., M.Sc. 1½ years Research Chemist, lubricating oil. 8 months Senior Assistant, pathological laboratory. 2 years Production Chemist, pharmaceuticals. 2½ years Development and Production Chemist, cosmetic manufacturers. 2½ years Senior and Deputy Chief Chemist, paper converting industry. 3½ years Chief Chemist and Chemical Manager, light electrical engineering. At present Chief Chemist and Chemical Adviser, light electrical and electronic components manufacturer. Has taken courses in production control, costing, X-ray crystalography, management, quality control, chemical inspection and at present preparing for final L.S.E. examination. Seeks appointment as **WORKS OR PRODUCTION MANAGER**, preferably in cosmetic industry. London area—preferably N. London—or U.S.A., Germany or Iran. £1,650 p.a. min.

**Ref. A.700.** British. Male. Married. Age 31. H.N.C. (Mech.), B.I.M. (Inter.), G.I.Mech.E., Grad.I.Prod.E. 5 years Engineering Apprentice and 3 years Experimental Technician, ordnance factory. 4½ years Development Engineer (Plastic Extrusion), cable makers. At present Mechanical Design Engineer, electrical engineers. Seeks post as **MECHANICAL ENGINEER (SALES, DESIGN, PRODUCTION OR METHOD STUDY)**, interested in plastic extrusion or general engineering. London or Home Counties—preferably Kent. £1,100 p.a.

**Ref. A.701.** British. Male. Married. Age 32. Mech./Eng. Diploma, Grad.I.Mech.E. Experience includes 3½ years Section Leader (Experimental), rocket engines). 1½ years Assistant to Director (Sales and Development), liquid pumps. At present Design and Contracts Engineer, nuclear power plant. Seeks post as **SALES/DEVELOPMENT ENGINEER**, London. £1,300 p.a. min.

**Ref. A.703.** British. Male. Age 57. A.R.S.M., M.I.M.M., A.M.I.Mech.E. 2 years Assistant Engineer, mining. 1 year Assistant Works Manager, chemical works (distilling oil and benzole). 1 year Assayer and Surveyor, mining. 27 years Technical Assistant and Director, mining consultants. 3 years self-employed as industrial and technical consultant. Experience covers general mine management and operation, prospecting (surface and aerial survey, geophysical prospecting, mine development), ore treatment (crushing, grinding, concentration, mill design, ore transport and storage), mine ancillary service (power generation and distribution, compressed air, pumping, ventilation, railway, workshops, foundry, water supply), ore sales and shipping procedure, stock control and storekeeping and market investigation. Seeks **TECHNICAL/ADMINISTRATIVE** appointment, anywhere considered but U.K. preferred. £2,000 p.a. approx.

**Ref. A.705.** British. Male. Married. Age 41. O.N.C. (Building H.N.C. Civil Eng.), A.M.I.C.E. 3 years Designer/Detailer, structural steelwork engineers. 4 years Designer/Detailer, reinforced concrete engineers (including site experience). 4 years Engineering Assistant, consulting civil engineers. 3 years Civil Engineer (i/c site drawing office, steam power station), civil engineering contractors. 3 years Structural Section Leader (including control of staff of 40 designers and all necessary duties for control of design office), designers and constructors for petroleum and chemical industries. 2 years Senior Civil Engineer, civil engineering and building contractors. Considerable experience in R.C. and Structural Steelwork design for heavy industrial and general building work, planning and site work for bridgeworks, harbour and steam power station contracts. Seeks appointment as **DESIGN ENGINEER (CIVIL OR SECTION LEADER)**, London. Salary £1,650 p.a.

**Ref. A.708.** British. Male. Single. Age 25. B.Sc. (Applied Chemistry). 7 years Technical Officer, manufacturer of surface coatings. Experience includes research and development work contact, with factory problems and technical representation, advising on customer problems. Seeks post in **PRODUCTION STUDY OR AS DEVELOPMENT CHEMIST**. London area. £950 p.a. approx.

**Ref. A.709.** British. Male. Married. Age 50. D.L.C. (Hons.), A.M.I.Mech.E. 14 years Qualified Technical Officer in R.E.M.E. i/c Technical Publication Section. 6 months Technical Assistant, motor company. 2½ years Technical Editorial Assistant, technical publishers. 3 years Technical Assistant, oil company. 6 months Senior Technical Assistant, motoring organisation. 3½ years Specifications Engineer, oxygen plant manufacturers. At present Technical Journalist, packaging specialists. Free-lance writer on railways. Good French, German and Italian. Seeks appointment in **TECHNICAL INFORMATION JOURNALIST/WRITER**. London area. £1,200 p.a. min.

**Ref. A.712.** Irish. Male. Single. Age 27. Barrister-at-law. 2 years Personal Secretary, American antique dealer. 1½ years Sales Office Administration with international manufacturing concern. At present Research Executive, industrial, agricultural and economic consultants, responsible for preparation and presentation of detailed economic surveys and market reports and maintenance of comprehensive information system by contact with industrialists both in U.K. and abroad. Seeks post in London, Ireland or Continental Europe. £1,200 p.a. min.

**Ref. A.713.** British. Male. Married. Age 46. H.N.C. (Mech.). 3 years Engineering Student Apprentice. Experience includes: 1½ years Design Engineer, chemical and petroleum plant constructors; 2 years Assistant Technical Officer, chemical manufacturers; 3½ years Senior Technical Assistant, aircraft and marine engine manufacturers; 18 years Senior Technical Planning Control Officer, general engineers and steel makers. Assistant to Job Engineer on petrol project, petroleum and chemical constructions. Seeks post **PETROLEUM AND CHEMICAL EQUIPMENT. BUYER/CONTRACT HANDLING/PROGRESS INSPECTION AND TESTING HEAVY ENGINEERING EQUIPMENT/ESTIMATING AND PROGRESSING ENGINEERING AND SCIENTIFIC PLANT AND EQUIPMENT/STANDARDS ENGINEER/TECHNICAL REPRESENTATIVE OR SALES ENGINEER**. London. £1,000 p.a. approx.

**Ref. A.714.** British. Male. Married. Age 43. O.N.C. Mech. and Elect., H.N.C. Mech., A.M.I. Mech.E., A.M.B.I.M. Experience includes intensive radar training, Army. 4 years Project Engineer, aero engines. 4 years Assistant Technical Officer, explosives and chemicals. 2 years Works Manager, light engineering and anodising. 5 years Estimator engineers—land and marine auxiliaries. At present, Management Consultant with management consultant organisation. Seeks appointment **UTILISING PREVIOUS EXPERIENCE**. Preferably Scotland but would consider elsewhere. £1,500 p.a. approx.

**Ref. A.715.** British. Male. Married. Age 33. O.N.C. Elect. Eng. 3 years Apprentice Instrument Maker, scientific instruments. 3 years Service Representative, accounting machines. At present Service Engineer, scientific instruments. Seeks post as **TECHNICAL REPRESENTATIVE OR LABORATORY MECHANIC**, preferably Essex or Central or East London. £800 p.a.

**Ref. A.716.** British. Male. Married. Age 40. 1st Class Structural Engg. Cert. 8 years Apprenticeship/Templatemaker, structural and bridge engineering. 2 years Draughtsman, boilermakers. 2 years Draughtsman, structural and plate fabricators. 6 years Assistant Structural Engineer (reconstruction of steel works), steel and tube makers. 6 years Assistant Structural Manager, structural engineers. Seeks post U.K. or abroad as **STRUCTURAL WORKS MANAGER/ASSISTANT/REPRESENTATIVE OR INSPECTION WORK**. £1,000 p.a. min.

**Ref. A.717.** British. Male. Married. Age 50. O.N.C. Mech. and Elect., H.N.C. Elect., A.M.I.A.E., A.M.I.W.M. 5 years Apprentice and Articled Pupil, corporation transport and engineering department. 2 years Stress Calculator and Estimator, civil engineers. 2 years Assistant Manager, general and automobile engineers. 19 years Inspection Department/General Managers Department (covering Inspection and Development of special-purpose Test Rigs and Equipment for Flight and Ground Use), Deputy Works Engineer/Production Engineer (to engine reconditioning factory)/Flight Research and Development Department (designed and developed power-operated control system for the Brabazon and specialised in Hydraulics and Electro-Hydraulic Systems and Test Rigs)/Customer Liaison Duties/Loaned to Housing Division (to assist production method planning of project)/In charge hydraulic and electro-hydraulic servomechanisms laboratory, aircraft company. 4 years Works Manager, opened factory from scratch to self-contained unit of 1,200 personnel, including subcontract department and research and development section for special instruments and gyroscopes. 1 year Production Director, plain and thinwall bearing manufacturers. At present Works Manager, light general and electronic engineers. Seeks post as **GENERAL OR WORKS MANAGER/TECHNICAL REPRESENTATIVE/SALES ENGINEER / DEVELOPMENT ENGINEER**. U.K. preferably S. England or Scotland. Commencing salary £1,750 p.a. approx. if prospects assured.

**Ref. A.718.** British. Male. Married. Age 44. A.M.Ins.W. 5 years Apprentice (Welding), ship builders and general engineers. 3 years Maintenance Engineer, sugar refinery. 7 years Assistant Welding Engineer, armoured vehicle manufacturer. 13 years Chief Welding Engineer, civil and mechanical engineers. Conversant with all procedures and codes of practice, i.e. A.P.I., A.S.M. E. Brit., Standards, Lloyds Reg. and with all aspects of overland oil and gas pipe lines. Seeks post as **CHIEF WELDING ENGINEER**. London area. £1,500 p.a.

**Ref. A.719.** British. Male. Married. Age 51. 5 years Planning Engineer, aircraft manufacturers. 2 years Assistant M/C Superintendent, general engineers. 4 years, Technical Costs Officer aircraft subcontracts. 3 years Estimator, lifts. 4 years Chief Planning Engineer, internal combustion engineers. At present Planning Engineer, automobile transmissions. Seeks post Central or N. London or Hertford as **PROCESS PLANNING ENGINEER** (wide experience m/c tool application and method study). £1,000 p.a.

**Ref. A.720.** Indian. Male. Single. **RESIDENT U.K.** B.Sc. (Eng.) (Mech.) (London), G.I.Mech.E. applied for. Seeks post as **GRADUATE ENGINEER (MECHANICAL)** anywhere but London preferred. £750 p.a.

**Ref. A.722.** British. Male. Single. Age 23. B.A. (Hons.) Social Studies. National Service now complete, Pilot's 'A' Licence. Seeks post as **ASSISTANT OR TRAINEE EXECUTIVE**, U.K. or Europe—preferably Germany. £650 p.a.

**Ref. A.723.** British. Male. Single. Age 37. B.Sc. (Maths.). 5 years Engineer, R.N. (Communications). 2 years Development Engineer and 2 years Projects Engineer, communications engineers. 5 years Chief Engineer and 2 years Technical Manager, electrical and electronic engineers. Seeks appointment as **TECHNICAL EXECUTIVE** (consid. electronic experience). London, Europe, Americas. £1,500 p.a.

**Ref. A.614.** British. Male. Single. Age 37. O.N.C. Level and Marine Engg. Cert. 5 years Workshops training and Draughtsman, aircraft production. 3 years Draughtsman, aero engineering production. 1 year Draughtsman, equipment manufacturer. 2 years Merchant Marine Service Engineer, diesel. At present Draughtsman, marine and transmission consultant engineers. Seeks post as **DRAUGHTSMAN OR TECHNICAL REPRESENTATIVE**. London or abroad. £1,100 p.a.

LIVERPOOL
REGENT ROAD
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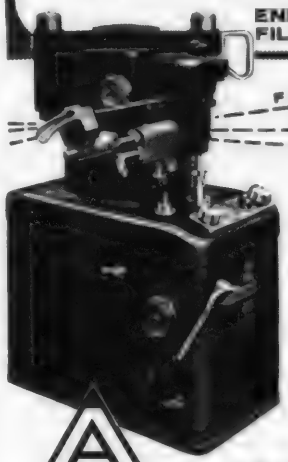
**END LABORIOUS HAND FILLING OF SAUSAGES!**



FAST OPERATION
ACCURATE WEIGHING
NO WASTAGE

At last sausage making is fully automatic. Just press a button on the A.B.R. filler linker and you can produce up to 200 sausages a minute! There's absolutely no wastage or contamination. No oil can reach the meat and there are no crevices for the meat to pass through. The machine is adjustable to suit any type of casing or sausage meat. An automatic holding device can be supplied for synthetic casings.

Anyone can operate or maintain the A.B.R. filler linker—it has automatic lubrication and only three grease nipples requiring once-monthly attention. Two sizes: 110 lb. and 155 lb.

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*Automatic*
**FILLER LINKER**

**40 lb. FILLER**
Ideal for the small manufacturer. Takes hard, deep-cooled or soft sausage mixes. Knee-action lever for easy control. Single- or 3-phase motor.

*Other machines include:* BOWL CHOPPERS, MINCERS, BAND SAWS, FAT DISPENSERS, CLARIFIERS, ETC.

To AMASAL LIMITED, Butchers' Supplies Division, Caldwell Spice Mills, Nuneaton, Warwickshire. Tel: Nuneaton 4012

An Amasal COMPANY

*Please send full details of the A.B.R. AUTOMATIC FILLER LINKER without obligation to:*

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*Please tick size req'd.* 155 lb. ☐ 110 lb. ☐ 40 lb. ☐ F.M


## ANNUAL GENERAL MEETING

### SCRIBBANS - KEMP

The thirty-third annual general meeting of Scribbans-Kemp Limited was held on Oct. 17 in London, Mr. F. N. Martin (the newly-elected Chairman and Managing Director) presided and said:

Mr. Oliver-King, who has occupied this position with such distinction for so many years, has indicated to the Board that he wishes to relinquish his position as Chairman and Managing Director and the Board has, with great reluctance, acceded to his request. The directors have appointed me as his successor and Major General G. P. B. Roberts as a vice-Chairman, and we are very pleased that we and the Company will continue to have the benefit of Mr. Oliver-King's wisdom and experience as a continuing Director.

In his circulated statement, Mr. Oliver-King the retiring Chairman, said that the profit for the year after depreciation but before taxation amounted to £818,912 against £416,923 last year. The profit achieved represented a stage in the recovery of the Group, the improvement having been due to better results from the Bakery Division.

Exports had continued to grow, and in spite of increasing difficulties in many markets, a further 6 per cent. over-all advance on last year's sales had been achieved.

The flour confectionery group had shown the most marked improvement in profit, an improvement which should continue. The retail side of the business had also improved.

The report was adopted and a total distribution of 10 per cent. approved.

## FOR SALE

**For** Hire and Sale, Forklift Trucks of every description including Electric Reach Trucks, Side Lift; all tonnage powered by diesel, electric, l.p. gas and petrol.—B.G. Plant (Sales Agency) Ltd., Watlington 44, Oxon.


**Miracle Mills**
(Regd. Trade Mark)

**Grind in one operation to desired Fineness**

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| OATS | WHEY | PHOSPHATES |
| CHAFF | SUGAR | CARBONATES |
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*Scope of Products successfully handled practically unlimited*

**MAXIMUM OUTPUT at LOWEST COST**

**OVER 17,300 SATISFIED USERS**

*Write for catalogue F.M.*

**MIRACLE MILLS LTD**
90 LOTS ROAD
LONDON, S.W.10
*Telephone: Flaxman 1456 (5 lines)*


## MACHINERY AND PLANT FOR SALE

**FOR SALE.** One second-hand Brecknell Mark II ¼ lb. Butter or Margarine Packing Machine, with reel feed, designed for direct packing.—Write Box J.704, W.P.S., 4 Holborn Circus, E.C.1.

**FOR** Sale. Second-hand Northey Type 1652 CWD Positive Rotary Watercooled single stage Oil Free Gas Compressor.—Write Box K.705, W.P.S., 4 Holborn Circus, E.C.1.

**FOR** Sale. Three second-hand Forgrove ¼ lb. Butter or Margarine Packing Machines, 2 reel feed, 1 stack feed.—Write Box L.706, W.P.S., 4 Holborn Circus, E.C.1.

**JAM** Cooling Tank on castor mounted frame by Brierley, Collier and Hartley, with copper outer case and stainless steel interior; dimensions 7 ft. 6 in. long by 2 ft. 9 in. wide by 10 in. deep; working capacity 45 gal.; 3 in. treacle valve discharge. Equipment is unused.—Offers to Box B6001, *Food Manufacture*, 9, Eden Street, N.W.1.

2—200 galls. per hour, Jenson and Anderson Homogenisers with Moss Gear Units and 20 h.p. motors.
1—Webster 8-head Crown Corker complete.

**Apply:—Mr. Maughan, Express Dairy Co. Ltd., 15/17, Tavistock Place, London, W.C.1. Phone: Euston 2828.**

## PLANT WANTED

**WANTED.** Glass-lined Tanks (4), approx. 1,500/2,000 gal., vertical. Also One 500 gal. Good condition.—Box B6000, *Food Manufacture*, 9, Eden Street, N.W.1.

## SITUATIONS VACANT

**PRODUCTION** Manager required for expanding business in the South of England. Must be experienced. Excellent prospects.—Full particulars and salary required to Box B5994, *Food Manufacture*, 9, Eden Street, N.W.1.

**CHIEF** Engineer for Canning Factory in East Anglia. Wide experience of Boilers, Plant installation and maintenance essential. Good salary and superannuation scheme.—Full details of experience, age and present salary to Box B5995, *Food Manufacture*, 9, Eden Street, N.W.1.

**APPLICATIONS** are invited for first-class Salesmen to sell high quality machinery plant and equipment to the Butchery Trade. This position is permanent and pensionable. Remuneration will be by salary and commission and a Company car will be provided.—Apply Box B5997, *Food Manufacture*, 9, Eden Street, N.W.1.

### BISCUIT TECHNOLOGIST

**is required as Quality Controller by a large Company.**

He will be responsible to the Board for the maintenance of a high standard of product quality, will assist in technical problems of manufacture and must be interested in product development. Practical experience of modern techniques for the manufacture of biscuits and allied products is essential. A scientific background and a knowledge of hygiene and packaging would be advantageous. Salary according to experience and qualifications, but not less than £1,750. Pension scheme.

**Write Box FM.759 c/o Hanway House, Clark's Place, E.C.2.**

### WORKS CHEMIST

Small Bakers' Sundries factory within a large organisation requires Works Chemist. Knowledge of bakers' sundries and preserve manufacture desirable but not essential. Non-contributory Pension and Sickness Benefit schemes. Write giving details of qualifications, experience and salary required to—

UNI-BE BAKERS' SUPPLIES LTD.
248/250 Bath Road, Slough, Bucks.

Sales Manager/Traveller. United Kingdom selling agents for an internationally famous Swiss manufacturer of flavouring essences requires a top notch salesman well introduced in the bakery, confectionery and soft drink industries. Initial work will involve organisation and active selling throughout the United Kingdom and ultimately will be confined to outright management of the department. Excellent salary and prospects for intelligent, hardworking, conscientious and enthusiastic applicant. Applicants please state age, experience, present position and salary to Box B5982, *Food Manufacture*, 9, Eden Street, N.W.1.

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FOOD MANUFACTURE

## MUST BE PREPAID

4/- per line minimum 12s.

Box numbers, 2s. 6d. extra.

***Replies to***

**BOX NUMBERS**

should be addressed to
*Food Manufacture*, Leonard Hill House,
9 Eden Street, London, N.W.1

## SITUATIONS VACANT

**SELLING** to Industry. Interesting opportunity, with good prospects, exists for young man aged 25/30 to train as Salesman of Aromatic Chemicals and Perfume Compounds to Manufacturers of Soaps, Cosmetics, etc. The situation offers a good basic salary and commission, as well as a car on completion of training; non-contributory pension scheme; intelligence, enthusiasm and personality essential. Candidates should also have some experience of selling to Manufacturing Industry.—Reply to Box B5998, *Food Manufacture*, 9, Eden Street, N.W.1.

## SITUATIONS WANTED

**CHEMIST** experienced in Canning and Bottling for 5 years seeks position. Ready to serve anywhere. Minimum remuneration. Apply Box B5993, *Food Manufacture*, 9, Eden Street, N.W.1.

## SPECIAL ANNOUNCEMENTS

**BRITISH SIDAC LIMITED of St. Helens, Lancashire, whose Scottish office is at 34, Elmbank Crescent, Glasgow, C.2, manufacturers and converters of transparent cellulose film have entered into an Agency and Marketing Agreement for Scotland with T. & R. GRAHAM LIMITED of Bridge Street, Paisley, Scotland, converters of transparent cellulose film.**

**T. & R. Graham Limited will act as agents for British Sidac Limited in Scotland as from the 1st October, 1960. The effect of this Marketing and Agency Agreement will be that the benefit of the the combined resources of the two Companies will be availabe to Scottish customers.**

## PATENTS

**THE** proprietor of British Patent No. 713925, entitled *Potato Chip Construction*, offers same for license or otherwise to ensure practical working in Great Britain.—Inquiries to Singer, Stern and Carlberg, 140, S. Dearborn Street, Chicago 3, Illinois, U.S.A.

## MACHINERY AND PLANT FOR SALE

**One** WL type Cellophane Wrapping Machine, Makers: Autowrappers, Norwich. Year: 1957. For packets size 5¾ in. by 3¼ in. by 1 in.—John Crampton and Co. Ltd., Altrincham Road, Wythenshawe, Manchester, 22.

PHONE 55298 STAINES

**STAINLESS** steel Pasteurisers 50 by 100 gal. A.C. Stainless steel vacuum "Z" blade Mixer approx. 3 ft. 6 in. cube, 60 h.p. A.C. Aluminium enclosed Tank, 600 gal. with agitator. Stainless steel chilling Drum, 33 in. by 26 in. diam., 2 h.p. Jacketed Filter Press, "Johnson", 8 plates, 9 frames, 25 in. sq. Roller Conveyor, 14 in. up to 74 in. wide (large quantity). Horizontal Retorts, 6ft. by 3 ft. by 3 ft., 15 w.p. Vertical cylindrical Retorts, 3 ft. 4 in. by 4 ft. 6 in. deep, 25-35 w.p. Welded steel jacketed pans, 40 and 60 gal., 50 w.p. Worm Conveyors, Bucket Elevators, Grinders, Refiners and Crushers, Hydros, Pumps, Ball Mills, etc. Send for Lists.—Harry H. Gardam and Co. Ltd., 100, Church Street, Staines.

**ONE** W.L. type Wrapping Machine, No. 1860 for packet size 5¾ in. by 3¼ in. by 1¼ in Makers, Auto Wrappers, Norwich. Year, 1957, in good condition.—J. Crampton and Co. Ltd., Altrincham Road, Wythenshawe. 2272.

**VACUUM** Can Seamer by Ashworth and Parker for sale. Auto feed, clinching mechanism, provision for lid magazine. Capacity 3¼ in. diam. by 4½ in. high. Motor driven. Photo, etc.—F. J. Edwards Ltd., 359, Euston Road, London, N.W.1.

**A** reconditioned Labelling Machine carrying the maker's guarantee, is a better proposition than second-hand plant. These are available from time to time from Purdy Machinery Co. Ltd., 41-42, Prescot Street, London, E.1.

## MACHINERY FOR SALE

**PEERLESS** Fairfax Meat Chopper. Large capacity, as new. £115. Hill, Wymondham, Leics.

## GOODS FOR SALE

**250 gal.** stainless steel Tanks, Mono type H3 F.M.B. stainless steel Pumps with trolleys, Alite Automatic Filler, Kneaders, Mixers, Dividers, Moulders, Racks, Provers, Baking Sheets, etc. Your enquiries welcomed. Extended credit facilities with free Life Assurance. — Sorensen Bakery Equipment Ltd., 42 Raby Street, Manchester 16. Tel.: Moss Side 2054/4054. 'Grams: Rahbek.

**COUNTER** that Rising Cream Cost. "Cream-Master" Cream Whipping Machines will give you a minimum 25% saving and an improved non-weep cream. Let us send you full details. —Sorensens, 42, Raby Street, Manchester, 16.

## MATERIALS FOR SALE

**CETYL STEARYL** Alcohol, edible qualities available for November delivery. Various stearyl contents.—Box B5991, *Food Manufacture*, 9, Eden Street, N.W.1.

**WANTED**
**DIESEL GENERATING SETS, DIESEL ENGINES AND MARINE ENGINES**
**from 30-2,000 h.p. Immediate cash settlement.**
**Particulars to:**
**D. ARNOLD,**
**Feltham Road, Ashford, Middlesex.**
**Telephone: Ashford 3349**

### CLARNICO LIMITED

MAKERS OF FINE SWEETS

CHIEF ENGINEER required for London Factory to be responsible for all engineering services at modern confectionery plant, including mechanical and electrical maintenance, steam raising and distribution, power, development of plant and layouts, etc. Candidates aged 30-45 should be Professional Engineers. Experience in Food Factory work desirable.

**Apply:—Engineering Director, Clarnico Ltd.**
**Dept. D, Waterden Road, London, E.15.**

## SECOND-HAND PLANT FOR SALE

**CLARK** Petrol Forklift Truck. 4,000 lb. capacity. 9 ft. lift. Solid rubber tyres. 2 speeds forward. 2 speeds reverse. Tilting boom. In excellent working condition. £595. Speed Electrics, Dept. FM., Church Street, Basford, Nottingham. Tel.: 75716.

**HOBART** M. E. 800 four-speed Mixing Machine with 80 quart bowl and equipment. Also Lehmann 600 lb. Chocolate Kettle arranged for steam heating. Complete with motor drive.—Details from C. Skerman and Sons Ltd., 118, Putney Bridge Road, S.W.15. VANdyke 2406.

**FOR** re-built Refrigeration Equipment, all types and sizes, try Alfred's Ices (1954) Ltd., 1-5, Hall Place, Paddington, W.2. Tel.: PADdington 6619/10.

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**FOR SALE— FACTORIES**

CANNING FACTORY. North Western area, approx. 30,000 sq. ft., fully equipped for high production. Close to rail siding and docks.—Enquiries to Box B5996, *Food Manufacture*, 9, Eden Street, N.W.1.

## PRODUCE FOR SALE

**PRODUCE FOR SALE**

Red Beetroot, 200 tons of good quality round red beetroot, graded to various sizes.

**P. Lindley & Sons (Epworth) Ltd., Epworth, Nr. Doncaster, Yorks. Tel. Epworth 354.**

## FOR SALE

**MANUFACTURER** can offer regular weekly supplies of Home Produce first quality Whey Butter.—Apply Box B5988, *Food Manufacture*, 9, Eden Street, London, N.W.1.

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# 600

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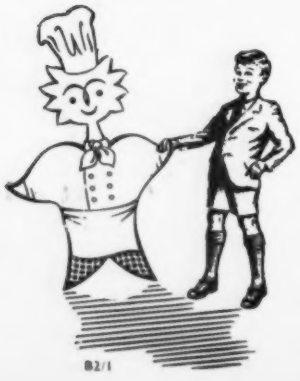


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